



FOR ACOUSTIC COUPLERS
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Computer Weekly

Thursday, August 19, 1982

Price war threat as micro stocks pile up

by Kevin Cahill
A MAJOR price war is threatening high street micro vendors as stocks pile up in distributors' warehouses.

Already Apple has cut £300 off the price of the Apple II in a bid to stimulate sales, and Tandy has followed with a £200 drop on the TRS80.

But distributor-led price cuts are likely to be rapidly exceeded by the dealers themselves as they fight for a bigger slice of the market.

At a recent seminar, former Apple European vice-president Tom Lawrence gave figures which showed European sales of micros generally rising by over 68% in value between 1981 and 1982.

The figures showed sales in 1981 at £380 million, rising to £640 mil-

lion for the whole of 1982, with Apple increasing its share of the European market from 26% in 1981 to 29% in 1982.

These percentage figures mean that Apple's European revenues have risen from \$98.8 million in 1981 to \$185.6 million for 1982.

The departure of Lawrence, following hard on the heels of the company's manufacturing director in Cork, Alec Wrafter, has been accompanied by suggestions that these targets are not being met.

But Apple is far from being the only company beguiled into over-commitment by over-optimistic sales forecasts, and companies are now battling for market share.

The Office International Group in London signed an ambitious

deal to be the launch distributor for Toshiba's 8-bit T200 micro.

Roger Eden, the company's general manager, says that the market is soft but no softer than they expected. Many companies have still not found out who they are trying to sell to, he says, and stocks are accumulating at the dealers.

"The current recession is sorting the men from the boys, but we are confident that the strategy we have developed will give us a good market share," he added.

In the South-west, Don Martin of Edgeline Business Systems says that the last two months have been very quiet.

A spokesman at Tandy said that growth overall for 1982 was around 60% "but it is getting very competitive at the lower end."

Computer scoops govt with Finance Act text

by Kevin Pearson
A COMPUTER-based legal information system has beaten the government's official communications channel to the market with a full text version of the 1982 Finance Act.

Lexis, a legal search and retrieval system had its up-to-date version of the Act, which details the legislative changes made in the Budget, available to subscribers exactly a week after it became law on July 30.

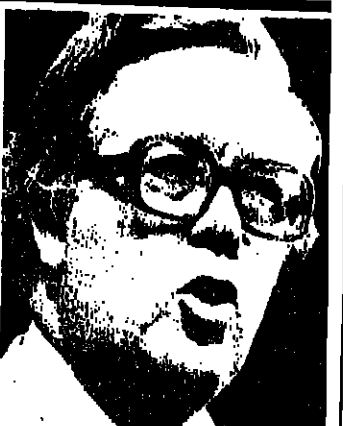
Not even Her Majesty's Stationery Office, HMSO, which publishes all UK legislation and government reports, could match this.

The Finance Act is the legal form of the Budget, given to Parliament by the Chancellor of the Exchequer Sir Geoffrey Howe, in April. However, between April

and the granting of the Royal Assent, the Finance Act undergoes many changes. Lexis had to keep fully informed on the Act and its passage through Parliament, in order to put the version out before the HMSO's official version.

Lexis is a subscription only, dedicated service covering all legal cases, and UK legislation. It is based on two Amihai computers located in Ohio. The computers are also used to provide a similar, but much larger service to the US and a third specially built Amihai is shortly to be added to the installation.

According to Kyle Bosworth, who manages Lexis in the UK, the system takes only 16 seconds to calculate the number of times a particular word is used in the 48,000 reported cases in the Gen-



Howe's words on disc.

eral English system.

The system has over 2,000 trained users in the UK.

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Acceptance of the Sirius 1 seen as a boost for the machine.

Currys takes on the Sirius 1 — but software trails behind

by Robert Parry
HIGH flier among the new breed of 16-bit business microcomputers, the ACT Sirius 1, has been taken on by high street micro retailer Currys Micro-C. But the right software for the machine is still trailing behind the hardware.

The 10 Micro-C stores are now supplying the 16-bit Sirius, joining a dealer list of about 270 that is growing at one a day according to ACT (Sirius) managing director Ed Sherman. He sees Currys acceptance of the Sirius as a boost.

"It is a mark of respect for the machine," he says, "and will certainly help us to get a couple of other big dealers."

Currys has a careful approach to picking micros to add to its range, and has rejected more than three quarters of the machines it has tested. The Sirius hardware was fine — "I don't hear the engineers complaining about it," says commercial director Derrick Clarke — and Currys has already shipped more than 20 machines.

But these have been mainly to "computer people", who will write their own software. "I am short of software packages for the Sirius," Clarke says, and he feels this might hit sales to businesses wanting packaged solutions to business problems.

The main stumbling block at present is the accounting packages. Currys has gone with Sys-

tematics software on Apple systems and Spectrum for Commodore. Neither runs on the Sirius.

"It would be a big cost for a organisation like ours to keep changing software, with so many people to re-educate. We couldn't afford it," says Clarke.

But both the Systematics and Spectrum software is being converted to run on the Sirius, and should be ready next month. Clarke says, and he feels this might hit sales to businesses wanting packaged solutions to business problems.

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ICL makes it £60 million in PAYE coup

by Kevin Pearson
ICL has pulled off an amazing £60 million double with the Inland Revenue by winning the £20 million contract to supply 18,000 terminals for the PAYE computerisation project. The company was given the contract to supply 47 mainframes for the system, valued at over £40 million in 1980.

But a potential storm is brewing over the decision. Plessey, one of the two other companies tendering for the deal intends to ask the Inland Revenue how it reached its decision.

A spokesman for the company said it was not seeking a reversal, but wants an elaboration on why it did not get the contract.

Ferranti, the other company in the running, refused to comment on the decision.

There will no doubt be a few raised eyebrows by the US manufacturers, none of which was involved in the final stages of this tender. The controversy raised when ICL was given the mainframe contract under the government's preferential procurement policy has not died down. IBM was so incensed by that decision

that it issued a statement attacking it, and did not tender for the terminals deal.

Olivetti, the only overseas supplier to be short-listed, withdrew from the battle earlier this year, but would give no reason.

ICL will now supply over 17,700 of its DRS 20 terminals, in addition to 47 2966 mainframes, to the Inland Revenue over the next four years. The first three mainframes are already installed at the Inland Revenue's National Development Centre in Telford. ICL will start to deliver the terminals in September, and will provide the first 400 in the year to September 1983. The remainder will be delivered before 1986, by which time most of the mainframes should be in place.

ICL can be reasonably sure that there will be no GATT (General Agreement on Trade and Tariffs) or EEC investigation into the deal, since only British companies were tendering. The EEC ruling on single tendering came into force in January 1981, barely two months after the government had announced that it had given the

mainframe contract, worth over £40 million, to ICL.

The timing of that decision particularly upset the US manufacturers in view of the fact the EEC had already said that single tendering was to be outlawed when the pro-ICL decision was announced. At the time Burroughs said that the decision was "illogical" since the policy was to be dropped.

In 1980 the project was valued at £150 million, including training, redeployment within Inland Revenue resulting from the project, as well as the hardware and software. It was estimated that £80 million of this would be internal cost to Inland Revenue. The remainder would be split between hardware and software for the system, in roughly equal amounts.

This already looks extremely optimistic as the mainframes and terminals alone will probably cost over £60 million. The external half of the contract could cost over £120 million, about 80% of the original total value of the project. And there is no telling by how much the internal costs will have risen.

Since the £10 million cash injection made last April by the Department of Industry, 23 of 32 UK software firms have had their applications for cash accepted under the Software Products Scheme.

The SPS was set up in 1973 by the DoI to stimulate software development in the UK by awarding cash grants to companies producing innovative and exportable products.

After last April the Department appointed an advisory committee drawn from the staffs of National Computing Centre, the Computing Services Association and the DoI to administer its revamped scheme.

Funds for the scheme have been divided into yearly allocations up to 1985, and of the £1½ million awarded since April, £500,000 will be drawn from this year's budget and the rest from the next two years. This leaves a further £1½ million in the kitty to be spent during 1982-3.

"The standard of applications has been very high, as is shown in the rate of acceptance," said David Ellis, NCC scheme manager. "We have been getting a good supply of proposals, most of which are in our preferred areas, and nearly all of which have got what we call 'additionality', meaning that the grant will enable the company to add features that it couldn't otherwise have done."

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The Chubb security company, which jointly owned Safe with chairman Philip Rule, has converted Safe's £1 million debts



ELSE... "High standard of applications."

£1½m bonus for software houses

by Maggie McLening
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France slips to fifth place in research

by Jack Gee
FRANCE is lagging in fifth place in the world league for technological research, and impairing the prospects for its computer and electronics industries according to a report just published in Paris by the National Credit Organisation.

France occupied third place ten years ago. It is now behind the US, Britain, West Germany and Japan. It is also the only industrial country in which research has accounted for below 2% of gross national product since 1960. On average the French percentage has hovered around 1.8%.

This compares with 1977 levels of 2.4% for the US, 2.2% for West Germany, 2.1% for Britain and 1.9% for Japan.

The result is that French firms' overall expenditure on research is half that of Japan and West Germany and six times lower than that of the US.

General Motors spends three times as much on research as the entire French automobile industry, and the Hoechst chemical firm more than the entire industry in France.

National Credit says a major reason for France's poor performance is the fall in the contribution of the public sector whose share of gross national product devoted to research has fallen from 1.55% to 1.05%. This is partly a consequence of a reduction in investment by the Defence Ministry.

Private financing of research by industry rose from 0.63% of GNP in 1968 to 0.75% in 1980 — well below the 1.1% level of Japan and the US.

The French government's objective is to boost expenditure on research from all sources to 2.5% of GNP by 1985.

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Telecomputing in Oxford has been awarded a grant of £164,000 to develop additional facilities for its TPS/VIM teleprocessing system, which is compatible across the ICL range of VME, TME and DME operating systems. This follows an earlier grant of £77,000 in 1981, which enabled Telecomputing to launch TPS/VIM in May.

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Political hitch delays plans for London 'technopark'

by Nicholas Enticknap
THE Prudential Assurance Company's plans for a "technopark" in South London have struck a political hitch.

The new Southwark Borough Council, elected in May with a mandate to provide more family housing, has rejected the plans accepted by the previous Council and is putting forward alternative plans of its own.

The idea for the technopark was jointly developed by the Pru and the South Bank Polytechnic. The idea is for a three-storey, 50,000 square foot building housing some 70 start-up companies specialising in high technology products.

The building would physically adjoin the Polytechnic, thus providing the companies with access to the Polytechnic facilities, including in particular expertise in the formulation of business plans and access to venture capital.

The space was available, as there is a derelict bomb site bounded on three sides by Polytechnic buildings and on the fourth side by the London road. This area is officially zoned for housing, however, so permission had to be obtained from the local council, the GLC and the Department of the Environment.

This process took about a year, during which the change of council took place. The Prudential is angry about the Council's change of mind, pointing out that "the project has involved us in almost a year's detailed outline planning, plus management time."

Computer financing

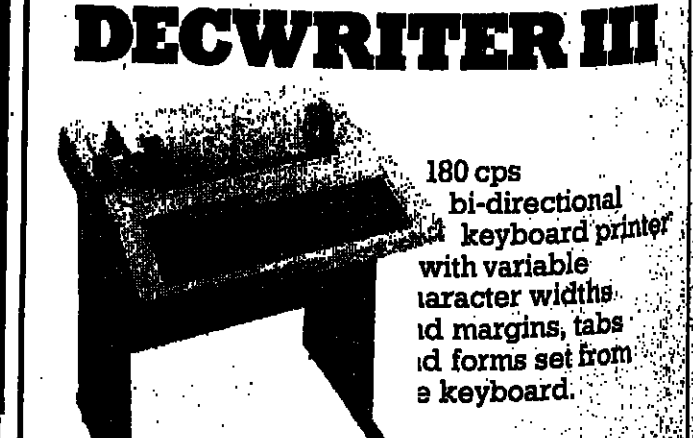
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Chubb sells Safe stake to City

by Kevin Cahill
SECURITY company Chubb has bowed out of the computer industry by selling a major stake in Safe Computing to a group of City institutions.

With turnover approaching £3.1 million, Safe ran into losses of over £200,000 for 1981/82. The subsequent cash crisis resulted in Chubb converting its loans to Safe into shares and loan stock and bringing £140,000 of new equity into the company via a 21 per cent share sale to United Computers and Technology and two other City institutions.

The losses emerged at the end of one of the company's heaviest investment periods, according to chairman Philip Rule.

"Last year we invested substantially in creating the MicroCobol version of Safe's production control package, along with investment in the new Safe package for

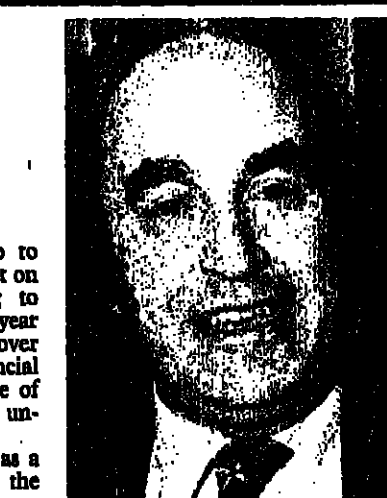
ICL's System 25.

"The two events lined up to produce an unfortunate impact on our profitability," according to Rule. The company ended the year to March with losses of over £200,000 and part of the financial restructuring involves the sale of the Safe bureau to another, unnamed company.

Rule described the bureau as a "burden" which deflected the company from its main software package business.

The new investment comes in the form of a 21 per cent stake in Safe by venture capital fund United Computers and Technology Holdings, a new City finance institution. UCAT is joined in the investment by two other City institutions.

The Chubb security company, which jointly owned Safe with chairman Philip Rule, has converted Safe's £1 million debts



RULE... "Bureau a burden."

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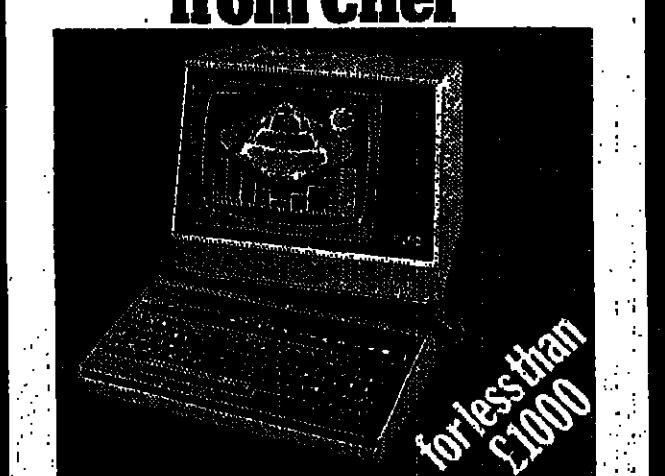
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It's hard at home — soft in East for ACT

by Robert Parry and Boris Sedacca
BIRMINGHAM-BASED systems house ACT last week found itself with a hardware battle at home as it pulled off a major software deal in Hong Kong.

And both situations revolve around the company's sales of a US-made computer, the Sirius I.

ACT's Hong Kong deal is straightforward. It is to supply software for the Sirius machine to Swire Systems for sale in the Colony.

But in the UK the company finds itself under attack in the market for the Sirius that it started only last November due to a misunderstanding of distribution rights.

From next month two versions of the US-built Sirius 1 16-bit micro will be available in the UK: the ACT Sirius I from the established distributor ACT, and the Victor 9000 from DRG Business Machines based in Weston-Super-Mare.

There is no difference between the machines save the packaging. For a dark box go to ACT, for a light one try DRG.

The ACT group has been selling the Sirius here since November last year. It set up a separate company, ACT (Sirius), to handle the product and has a network of about 270 dealers.

DRG has 35 dealers already carrying the Cado microcomputer, and will be using these as the kernel of an expanded dealer network for the Victor 9000.

Until recently ACT believed that it had exclusive distribution rights for the machine in the UK, just as Victor Business Products, Chicago-based offshoot of US industrial conglomerate Walter Kidde, held exclusive rights in the US.

But it turns out that part of the



FOSTER... "We don't see it as a threat."

deal with Victor, which played a large part in funding Sirius Technology Systems, was that Victor had distribution rights in the rest of the world too.

"We would much prefer they weren't coming over here," says ACT's group managing director Roger Foster, "but we don't see it as a threat." He reckons ACT will get new products from Sirius sooner than DRG can via Victor, and that DRG's margins on the machine will be smaller because of the three-link chain, giving ACT more scope on prices.

This view is not shared by DRG's managing director, Michael Kilmartin. "It's way out," he says, pointing out that Victor owns a large chunk of Sirius. He is pricing the Victor 9000

at the same level as the ACT Sirius, £2,395 for the basic system, and does not envisage a discount war.

In Hong Kong ACT recently signed a partnership deal with Swire Pacific, Hong Kong's second-largest industrial group, which is to provide a marketing outlet for ACT software in the Far East.

But Swire Systems, the new company, will not be getting its Sirius machines from ACT. ACT has not put up any equity capital in Swire Systems but has an option to purchase 25% in the future "at an attractive price", according to chairman Lindsay Bury.

ACT will provide the management and know-how about marketing Sirius.

Recession hits the U mainframe makers

by Kevan Pearson

THE European computer market underwent a dramatic reversal in 1981 as the profits of the US mainframe manufacturers came crashing following the depth of the recession and the rise of the dollar on the international exchanges.

The recession caused problems for the home-grown European computer industry too. ICL, Siemens and CII-Honeywell Bull have the same problems currently afflicting Burroughs, NCR and Honeywell: falling demand for large and expensive mainframe computers.

Even the might of IBM, still in first place, was humbled with a fall in sales.

The star in the massed American ranks is, predictably, Digital Equipment, which grew in Europe in the last financial year by 38%, compared with a 6% downturn in sales for IBM.

On the UK side ICL passed the post with a 5% sales drop, less than expected, and boding well for the future. But the real performer on the UK side must be Ferranti Computer Systems which, despite the dire economic strains of the UK economy, managed to show growth of 29%, against Plessey's estimated growth of under 10%.

But General Electric Company, which had a record year again, does not figure at all in the top 25 European computer companies. Its computer systems division is rumoured to be in difficulties, though its 4000 series machines are said to be very good products. They have the misfortune to be linked with the less than successful Prestel debacle which does their market image no good.

The other rising star of the European scene (as well as being a darling of the Wall Street analysts) is Wang with 34% growth in

Europe in dollar terms, an impressive overall growth of 50% a year.

The big unknown is European equation is CII-HB, recently nationalised by the French government, with Honeywell stake dropping from 47% to 31%. CII-HB's losses have been more dramatic than before Laidlaw and Wilton plied their particular brand of diac message.

One thing is sure, CII-HB not hold second place in the European Top 25 another year.

DEC is challenging and is at last beginning to show US success in Europe. It is soon move into second place, which would make it Europe's second largest computer manufacturer, the position it ready occupies in the US.

Honeywell wins big Scots office project

by Andrew Thomas

SCOTLAND'S first large-scale office automation project has been given the go-ahead by Strathclyde Regional Council. Honeywell DPS 6 minicomputers will provide the authority's 115,000 employees with word processing and electronic mail facilities, and the system is to be implemented in conjunction with the Department of Industry.

The two-year pilot scheme comes at a time when Honeywell is consolidating its Scottish presence. Glasgow City Council is to implement a major upgrade on its Level 66 installation, and most of the major distilleries, Aberdeen and Dundee Universities, Lothian Police and a number of local

authorities use Honeywell hardware.

Honeywell has long had a major manufacturing plant for DPS 6 and DPS 8 systems at Newhouse, Lanarkshire, employing 1,500 staff. A new sales office in the centre of Glasgow was opened by UK managing director Brian Long last week.

"I am delighted that the growth of Honeywell business in Scotland makes it not only possible but necessary to expand our capacity for serving the market," said Glasgow branch manager Archie Scott.

"I hope the ripples of our success will help to encourage an increasing measure of restored business confidence and economic recovery in this country."

£257m of loans save AEG

by Kevan Pearson

THE short-term future of Germany's stricken electronics giant AEG Telefunken, is secured following an agreement last week with its bankers to provide £257 million of loans.

The banks had previously over a month about how to their share of the government rescue package. They have agreed to the terms on the condition that the West German government comes up with loan guarantees.

The banks will provide 65% of the cash immediately, the other 35% only when the government has agreed to their terms. These loan guarantees would in addition to the export credit guarantees the government has already granted to AEG.

However, the loans will provide only a temporary lifeline to a company which earlier this month went into formal liquidation to avoid bankruptcy.

The price for the banks' cooperation is that the company go ahead with its drastic restructuring plan. This will include selling AEG's loss-making consumer business, and reorganisation of electronics and capital goods operations.

Such moves are likely to result in massive redundancies. The company employs about 50,000 people and redundancies could be as high as 20,000.

Telecom users fight back on price rises

by Nicholas Enticknap

STRONG opposition to British Telecom's proposed November price increases has come from the Telecommunications Users' Association. The organisation has sent a detailed critique of British Telecom's proposals to the Secretary of State for Industry, Patrick Jenkin.

The TUA does not mince its words: "The British Telecom case is short on facts and long on platitudes — mostly old platitudes at that."

Its case is essentially based on two points: that British Telecom gained far more from its last price rise than anticipated, and so does not need any extra revenue; and that its justification in terms of the competition it is now facing is unsound.

On the first point, the TUA points out that British Telecom's price rise last year cost its customers 6% more than it forecast. It contrasts this unfavourably with the corporation's estimated change

in the Retail Price Index, over which it had no control but which it nonetheless got right to within one per cent.

It also points out that British Telecom is currently carrying out a campaign to cut costs, with target savings of 8% in the current financial year and 10½% next year. No details of the results of this exercise have been published, it says.

Putting these two gains together, it estimates that British Telecom is at least £400 million better off than expected, and more likely over £450 million up. From this it concludes that the "justification for the current tariff increases needs to be more detailed than set out in the sketchy text accompanying the figures".

The TUA's second point concerns British Telecom's justification for the increases on the grounds that it is now facing competition. Pointing out that the only competition is coming from Project Mercury, which has yet to



JENKIN... Price increase proposals under fire.

prove itself and even if it does will only take away a tiny fraction of British Telecom's revenues, the TUA concludes, "British Telecom still has the most important and powerful monopoly and any claims to the contrary are wholly bogus".

The rise in telephone charges has had a significant effect on the

activities of large telecoms users, according to time sharing bureau Geisco. A spokesman said that users were more and more resorting to the use of leased lines to cut costs, and were also going more for the medium and high speed services in order to reduce connect times.

Five former managers of Software Sciences buy the unsold 'rump'

by Nicholas Enticknap

THE industrial high technology rump of systems house Software Sciences was bought last week by its managers.

A new company has been formed to take over the computer-aided engineering operations. Known as Tangram Computer Aided Engineering Ltd, the new company was set up by five former SSL managers with the aid of cash from the British Technology Group and backing from Barclays Bank.

Tangram, which aims to sell CAD/CAM products to small and medium-sized engineering companies, is based in Daventry and has been run by the five managers since April, when the bulk of SSL was sold by BOC to Thorn-EMI. Negotiations relating to the funding of the new company have just been completed.

The five managers, all engineering graduates, are Graham Bennett, Bill Cargill, David Ferrer, Henry Merryweather and Martin Squires, who joined SSL a year ago from Systime and has been named managing director. Between them they have put up

£50,000 for a 62½% stake in the company.

Other Tangram employees own a further 12½%, while the remaining 25% is owned by BTG. The group has put in a total of £115,000 in ordinary and preference shares, and is planning to invest a further £75,000 in loan stock once Tangram has established itself. Barclays is providing loan facilities of £150,000.

According to Bill Cargill, "The direction of the company has changed to some extent in the four months we've been on our own".

Tangram has also inherited two software products from SSL. They are Swift II, a mechanical components design and drafting aid, and PS2000, a control system for machines cutting flat plate.

The company's choice of name is imaginative. Tangram is the name of a Chinese puzzle, rather like a jigsaw, except that the pieces can be put together in a variety of ways. This, says Cargill, illustrates the way the company can put together a variety of products to make a system tailored to a particular customer's needs.

Wang to create 500 more jobs in Eire

by Robert Parry

ONE of the leading US office automation computer companies, Wang Laboratories, is to double the size of its Irish factory. Over the next three years it plans to create 500 jobs at the Limerick plant, bringing the number employed there to about 800.

"The Wang philosophy is to grow to about 1,000 people per unit, at a controlled rate," says Pat Sweeney, Wang's vice-president for international manufacturing. "We have the right products and sales force, and I am quite certain we will keep manufacturing busy, recession or no recession."

The expansion in Limerick

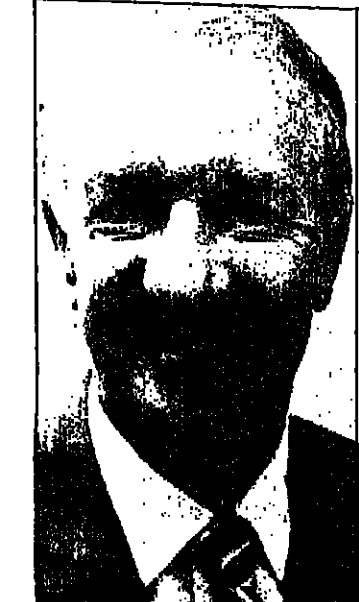
marks the second phase of Wang's \$33 million investment in Ireland. The company set up there in early 1980 with the support of the Irish Industrial Development Authority (IDA) and manufactures the OIS range of office automation products in its automated factory.

The output goes mainly to Europe, one-third being taken by the UK. "The manufacturing aim is to serve the marketplace," says Sweeney, and the range of equipment manufactured in Limerick for Europe is being extended to include the VS range of minis, which is "going great guns" according to Wang's UK managing director, Ian Dwyer.

Local manufacture implies local sourcing of components for Wang. So far European manufactured parts make up nearly half, by dollar value, of Limerick-built equipment, and Sweeney expects this to grow to 80% over the next two years.

He also indicates that some software research and development work may move over from the US. "Some of the basic stuff needs to be Europeanised," he says, "and this is currently done back in the US. Perhaps it should be developed centrally, then flavoured locally."

The IDA is encouraged by this continued commitment from "one of the stars in our firmament," as project manager John Lloyd puts it. Wang is one of many US computer companies to have located manufacturing plants in Ireland. The list includes DEC, Amdahl, Prime and Apple along with Japanese and European companies — and employs a high proportion of Irish graduates.



SWEENEY... "We will keep manufacturing busy."

Subsidies for UK software firms at Japan exhibition

SOFTWARE companies interested in visiting Japan during the Japan Software Industry Association annual software exhibition in October can, if they hurry, have the cost of their trip subsidised. The British Overseas Trade Board (BOTB) has agreed, under the auspices of the government's IT22 organisation, to contribute £710 towards the costs of companies interested in presenting their products at the British Export Marketing Centre during the exhibition.

The BOTB grant leaves the companies involved about £1,250 to find. To obtain it, they should contact Export IT no later than September 6 and as soon as possible. Only 12 places are open, and of these four have been filled. Companies that go will not only be able to exhibit their own products and visit the Japanese exhibition. The British Embassy in Tokyo has agreed to provide facilities for presentation, including interpreting, that will enable companies to talk to their Japanese counterparts, and will also arrange visits to Japanese companies.

French banking deal with Egypt

by Jack Gee

FRANCE'S State-owned Societe Generale clearing bank has signed an agreement to install a high performance data processing network for the National Bank of Egypt.

Under the five-year contract, which will involve an investment of \$3.5 million by the Egyptian bank during the first 12 months, Societe Generale's data processing subsidiary SG-2 will put between eight and ten IBM computers into service in branches throughout Egypt.

Societe Generale has already begun work in Cairo where two computers and 60 terminals are being

put into service at National Bank's head office. Other computers will be installed in the East and West Cairo offices.

A data processing centre is planned at Alexandria, two or three others in the Suez Canal area and the same number in Upper Egypt.

Keying in and retrieval will be conducted in Arabic. Richard Bruno, a senior data processing official at Societe Generale, says: "This is a launching pad for our know-how. We hope to expand throughout the Arab world."

For the Egyptian venture, Societe Generale and National Bank

of Egypt have set up a jointly owned subsidiary in which the Egyptians will hold 60% of the capital and the French 40%. National Bank has a staff of 6,700 at 30 branches.

Societe Generale's data processing branch now has minority stakes in companies in Argentina and Singapore as well as Egypt, and acts as a service firm throughout France.

It also has a stake in Norma, Portugal's leading data processing service company and is active in 18 countries. SG-2's turnover last year was £60 million.

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BLAIR... Mid-83 target.

Design centre for UK

by Kevin Cahill
LSI Logic, the Californian-based logic array designer and manufacturer will site its first non-US customer design facility in the UK.

Bob Blair, the company's international marketing vice-president, made the announcement last week in London, and confirmed that the site was likely to be between Reading and Bristol. "It must be within a stone's throw of the centre of the market," he said.

LSI's customers range throughout the electronics industry and consist principally of companies seeking to condense existing electronics functions from full board size, to units of a few, or even a single chip. Blair said that the target date for the facility was mid 1983.

The UK installation will be a "clone" of the current set-up in the company's head offices in Milpitas, California, complete with Amdahl V6 mips mainframe. "We do not intend to use either satellite or lease lines to hook into Milpitas. But our UK customers will have everything by way of design facility that exists in Milpitas," Blair said.

LSI's Milpitas facility has a complete manufacturing system for taking a customer's design through to prototype production, as well as the design facilities. The company, which is little over a year old, has attracted over \$16 million in venture capital, and \$11 million in lease facilities so far, making it one of Silicon Valley's more expensive start-ups last year.

LSI Logic is currently producing 10 to 15 new designs a month for its customers, but the target is one a day by the end of the year. To move into profit the company needs this kind of throughput.

Sinclair again hits snags with ad authority

by Robert Parry
DELAYS in the delivery of Sinclair's latest personal computer offering, the ZX Spectrum have landed the company in hot water with a consumer watchdog.

The backlog of undelivered orders for the machine is now stretched to 12 weeks and has brought a number of complaints to the Advertising Standards Authority. Sinclair ran into the same problems on the release of his first two machines.

Nearly 40,000 orders have been received since the Spectrum's April launch, and high rejection rates from the quality control checks at the Timex factory, coupled with Timex's annual three-week holiday break, caused the order backlog. Just under 20,000 Spectrums have been delivered.

But the factory is now back up to a production rate of 5,000 units a week, says a Sinclair spokesman, which should cut back the waiting list by the end of September.

Sinclair's trouble with the ASA stems from the requirement that mail order goods be delivered within 28 days. Several public complaints have been received by the ASA, and the matter will be going before its council shortly.

But Sinclair has already taken action. The advertisements for the machine through mail order have been cut because of the inability to fulfil the 28-day delivery requirement, and Sinclair has written to people waiting for delivery telling

them of the delay.

It has also offered a voucher worth £10 off the price of a Sinclair printer to go with the Spectrum when it is eventually delivered, along with a software demonstration tape. New orders - which are still pouring in at about 1,500 a week - are told to expect a 12-week delay and offered the choice of money back or the £10 voucher and tape.

Demand outstripping production capability is no new problem in the personal computer world. Acorn's BBC computer, launched in January, proved much more popular than Acorn or the BBC expected, causing persistent order backlogs for both versions. The backlog for the more powerful Model B has still not been shifted.

As if complaints from the public to the ASA were not enough problems for Sinclair, its Spectrum advertising has caused headaches to rise on more than a few of its personal computer rivals. An insert in various magazines includes a comparison of features on the Spectrum and machines from Acorn, Commodore, Atari, Texas Instruments and Tandy, and these companies have been quick to challenge some of the entries.

Observant readers of the advert will notice that a handful of changes have crept into the comparison table, particularly in the Atari 400 column. Sinclair has now put out three versions of the insert, correcting some errors in the first one at each release.

Amdahl solves an IBM upgrade dilemma

by Kevin Pearson
A LARGE IBM user has found an interesting solution to the thorny problem of upgrading its IBM 3033. Legan and General, one of the UK's largest insurance companies, has brought an Amdahl 470/V8 to run alongside its existing machine.

The problem faced by the company, in common with many other 3033 users, is that IBM's current product line, mainly the 3081 series which is now being shipped in bulk, represents a massive rise in power, beyond the immediate

need. IBM's 3083 series, which is a direct replacement for the 3033, will not be available in large numbers until 1983, so users are faced with the prospect of waiting for a 3083, taking a 3081 now or getting a second user 3033, as the leasing industry suggests, or getting a plug compatible machine.

The company's data processing manager, Jim Graves, says the V8 was bought for several reasons, but Amdahl's support for IBM's Extended Architecture on the V8 was significant.

Graves says support for Extended Architecture is "very important because MVS/XA is a major change."

Legal and General will be able to use the Amdahl as a development machine for MVS/XA without interfering with its main production systems, running on the 3033.

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FERTIG... Almost faced his subjects.

Pundit sees bleak future for PCMs

by Kevin Pearson

IT IS not often that the IBM-watching pundit lay their views on the line along with the opinions of the people they write about. But that is what IBM-watcher Bob Fertig did, earlier this year.

Fertig did not actually make his comments on the same platform as the speakers from National Advanced Systems, Amdahl and IBM, but he at least put their views alongside his own in his latest report.

An extremely rare occurrence, giving the subjects of a report what amounts to a right of reply - but that is what Fertig did.

Not that it did them much good. Fertig, in line with most of the other members of the IBM-watching fraternity takes a bleak view of the plug-compatible industry in the future. He believes IBM is a new, leaner and hungrier IBM than ever before, which no longer offers the PCMs a price umbrella under which to shelter.

It is also making radical changes in its operating systems which the PCMs will be hard put to copy, he says.

The massive software and expertise investment which has kept both IBM and its plug-compatible competitors in business is obsolete and will need to be replaced this decade, thus changing the face of the IBM market, according to the report.

Fertig dismisses claims by the PCMs that the existing IBM systems, estimated to be worth \$300 billion, will necessarily guarantee their continued business, especially when IBM begins to ship its new products, particularly its Extended Architecture, MVS/XA, in bulk. Fertig contends that the MVS/XA will place a major strain on the PCMs, which could break some of them.

He bases this view on the fact that IBM has not revealed the technical interface detail of MVS/XA, and adds that IBM will break with its recent policy of an-

nouncing these details when it makes first customer deliveries, at the end of this year.

Fertig believes MVS/XA constitutes a major change in direction for IBM, and that there is no reason why IBM should reveal details which give the PCMs an easy introduction into the new environment that IBM is creating with Extended Architecture.

The PCMs naturally disagree with this proposition. David Anderson, Amdahl's director of planning in California, gave this response to Fertig's scenario: "We think we know enough about this architecture that whatever the change is we can in fact implement it."

National Advanced Systems, the other major contender at the top end of IBM's market, takes a similar view. Both companies have announced that they will support MVS/XA on their large-scale systems.

Fertig also voices the other reason that the PCM business will have to change, and Amdahl will be the one most affected. The burden of profitability is shifting from selling CPUs to selling total systems, incorporating the CPU with peripherals and software.

Amdahl's business has been built on selling CPUs, and it is only now starting to offer a fuller range of products. This, says Fertig, is why Amdahl is likely to be relatively the worst affected PCM.

NAS does not suffer from the same problem, Fertig says in the report. NAS gets the Fertig vote of confidence because of its wide product range, including peripherals, because of its technological links with Hitachi, because its machines are heavily microcoded, like IBM's but unlike Amdahl's, and because NAS, which was formed out of the wreckage of crashed leasing giant Ite, is now profitable.

Details of the report IBM versus The Plug Compatibles are available from International Planning Information. Tel: 01-221 0998.

Fresh blow to Prestel

by Nicholas Rutledge
PRESTEL's waning credibility received a further damaging blow earlier this month when British Telecom removed all the pages on the system booked by Track 2, an advertising agency based in London's Notting Hill Gate.

This action, taken allegedly because Track 2 has failed to pay its bills, has meant an estimated 500 companies have had information concerning their products and services removed from the Prestel database.

British Telecom's decision is bound to disturb Prestel information providers, and so increase the

doubts currently felt about the future prospects of Prestel, triggered by the system's continuing failure to attract subscribers in economic numbers. Only 18,000 Prestel sets are currently in use, nearly two years after the system went public.

Asked to comment on this view, a Prestel spokesman said that another organisation called Business Pages had offered to take over the pages concerned and to publish them free of charge.

He added that there was a possibility that businessman Nick Grant would buy out Track 2 and take responsibility for its debts.

SALES BRIEF

Glasgow upgrade for Honeywell

HONEYWELL has won a £800,000 contract from Glasgow District Council to upgrade its existing house allocation system running on the company's L66 mainframe.

The contract will bring increased power to the main processors, as well as higher capacity peripheral equipment including six disc drives, a fast print and 62 VDUs.

£200m orders

RECENT orders from the UK and Middle East have brought total sales of the Plessey computer controlled AR3D mobile radar to over £20 million. AR3D measures direction, speed and altitude of aircraft within a range of up to 270 miles and is widely used for air traffic control (keeping aircraft apart) and defence applications (keeping aircraft together).

Key contract

MANNESMANN Tally has won an order from Key Computers of Dorset for more than £100,000 worth of printers and VDUs. This will be embodied in business minicomputer systems sold by Key for between £8,000 and £30,000, which use Onyx and Digital Equipment PDP-11 computers.

Hotel control

A £200,000 NCR mainframe has been installed in the 1,000-bed Concorde-Lafayette Hotel in Paris, for administration of the 30 hotels of the Concorde Group. The applications include accounting, budgeting, customer credit control, payroll and personnel management.

High-speed BT

BRITISH Telecom has bought three high-speed document readers for £300,000 from Lundy Farmington of Uxbridge. They will be used to read hand-written tickets containing details of operator-assisted calls, sort the data and produce magnetic tape input to BT's mainframe for direct billing.

First user

MAIDENHEAD micro systems builder Micro Scope has sold the first of its Videogates, which imitate Prestel's Gateway, to Thomson Holidays in a £100,000 contract. Videogate allows IBM users to implement private videotex systems, and Thomson has bought several to form the basis of a new videotex network for travel agents.

Holiday package

LONDON software house Harrison Computer Services has sold another Phobos package holiday booking system for £72,000 to a young people's holiday operator. Phobos allows online bookings from agents, produces documentation, and includes customer accounting.

Costing system

MEGABYTE of Leeds has sold an estimating and costing system to printer and label manufacturer Storey Evans for £25,000. It will be used to give quick estimates to prospective customers based on past experience, and to correlate this with the costs of fulfilling the contract.

Initial deal

BRITISH Olivetti has bought from Essex-based Datatec Terminal £50,000 worth of converters to allow its ET121 electronic typewriter to operate as a daisy-wheel computer printer as well. The initial order is part of a longer term deal expected to be worth £250,000 over the next two years.

SOFTWARE FILE

'Piracy killing off new product launches'

LACK of adequate protection against piracy is deterring software houses from releasing new products.

This is the view of Jonathon Baldachin, managing director of Little Genius, the company which has launched what is claimed to be a unique method of preventing unauthorised copying of discs and illegal use of software.

"I have spoken to many companies that have products ready to release, but they don't want someone else to get the benefit of their work," he said.

"Piracy kills off normal behaviour of the market, because the pirate can fill the market and supply the demand, inhibiting the commercial dealer. A possible result of this is an 'in/out' market, in which products are only saleable for six months before everybody has ripped them off, but you can hardly do this with something like a word processing package that has cost thousands to develop."

Although everyone is aware that the package software industry is rife with piracy no-one has yet been able to quantify the problem, partly because there are so many

different types of infringement.

"Quite apart from commercial piracy, where someone has copied the disc and sold it commercially under their own packaging, there is also casual infringement, where dealers make copies to throw in with odd machines, or to give to friends," said Baldachin. "Large corporations often buy only one copy of a piece of software and copy it for internal use, so that the supplier gets paid only for one licence instead of perhaps 20."

"There also the technical infringers, such as software houses that have paid for a compiler, but are distributing compiled code to people who haven't got a licence to use it or the support code."

Baldachin's answer is Protection, a system which protects copying of floppy discs by making each disc unique, with two identifiers located in different places on each one. This defeats bit-copiers such as Locksmith, Back-it-up, Copywrite and Copy II-Plus, because the replica is always slightly different from the original and will not run.

"We have used the disc's capacity in such a way that a bit copier

cannot tell the difference between data and non-data areas," explained Baldachin. "It means that we have to produce original copies all the time, but anyone who wanted to find out how it was done would have to work it out by hand."

There are many methods of software protection on the market, the majority a combination of hardware and software. Mektronik Consultants has developed SafeWare, a small hardware unit plus software interrogation routine which allocates a unique code to each application, similar to the original dongle produced for the Wordcraft package.

An alternative type of dongle is also available from accounting specialist TABS, which has been widely used to protect TABS' own software on all computers with an integral RS232 interface. This device, for which a patent is pending, fits on the RS232 interface of any CP/M-based machine and is addressed by the program disc, which checks for a serial number. Surprisingly, the product has met with little response in the UK, despite its low price of £60.



BALDACHIN... "Piracy kills off normal behaviour".

SOFTWARE BRIEF

50% offer to software developers

TO promote application software for its Dynabyte 5000 microcomputer system, Metrotech is offering 50% price reduction plus marketing advice to would-be software developers.

The offer is open throughout August and September and, since the Dynabyte 5000 offers standard CP/M, MP/M and Oasis operating systems, programs developed on it should be portable to other systems.

First product

BUREAU Dataolve, recently acquired subsidiary of Thorn EMI, is offering a financial consolidation package, Conquest, as its first product for sale. Aimed at large companies with multiple subsidiaries, Conquest is an interactive system.

Query by example

A HIGH-LEVEL query by example software tool has been launched by Norsk Data for its 16-bit and 32-bit minicomputers. Called Access, it allows the user to think of the database as a set of tables within which data can be inserted, amended, deleted or inspected using simple English-language commands.

Massive growth

THE US software products industry confirmed its position at the head of the data processing growth league, according to ADAPSO's latest annual survey of the US computer industry. Sales of software products rose by a massive 45% to \$22 billion, compared with an industry average of 24%.

Viewdata link-up

SOFTWARE that will enable viewdata users to link up with any computer database has been developed by SDL of Surrey. At present special software has to be written to convert each computer file into a viewdata file.

Conference

THE world's largest software conference will come to London in 1985. This is the International Software Engineering Conference, which is held every 18 months and is next scheduled to run for three days in Tokyo this September.

September 1 deadline for Extended Pascal

WORK is to begin on September 1 on drafting a domestic standard for Extended Pascal, the expanded version of the structural programming language developed by Professor Niklaus Wirth in Zurich.

The American National Standards Committee X3 Technical Committee on Pascal, X3J9, has set September 1 as the cut-off date for acceptance of proposals for potential extensions to be included in the initial draft. Proposals will still be solicited after this date, but consideration of them will be postponed until after the first batch have been examined by the Extension Task Group (ETG).

At the moment there are five proposals in the Candidate Extensions Library, including OTHERWISE in CASE statement, ranges in CASE statement, constant lists, ranges in CASE

variant constant lists, exponential operator, and extended WITH statement. ETG is also currently reviewing proposal areas such as schema arrays, random I/O strings, exception handling and separate compilation.

Committee X3J9 is undertaking to publish the Candidate Extension Library within a year of the cut-off date.

"The average rental period is between 14 days and a month," said John Chesney, joint managing director of SRB. "We have had a lot of enquiries, and are signing up new members every day."

Customers include GEC, Rowntree Mackintosh, the Central Electricity Generating Research Laboratories and the Midland Bank.

Big firms are trying before buying

FIRST reports from the innovative Software Rental Bank are that it is the large companies that are interested in trying before buying. Set up in July by the Apple Orchard mail order business, the Software Rental Bank is offering short-term rentals at up to 20% of the package's list price, or 10% to corporate members.

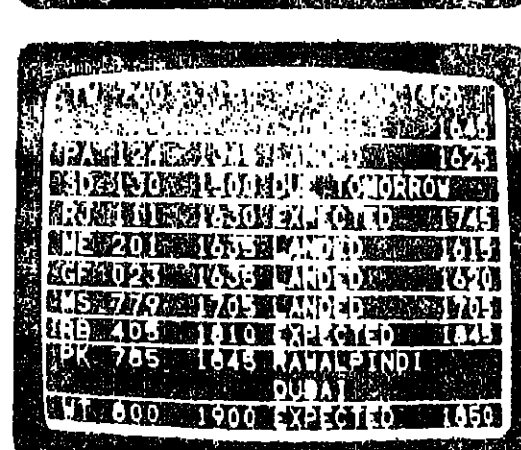
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Customers include GEC, Rowntree Mackintosh, the Central Electricity Generating Research Laboratories and the Midland Bank.

"Some of them actually want to try out Visicalc," said Chesney.

Arrivals

Flight - Time - Information



Bair system controls flight information at Heathrow.

Flight information system installed at Heathrow

PASSENGERS at Heathrow Airport are now dependent on software developed by Vaughan Systems and Programming of Ware, Herts, for flight information.

Vaughan, which has also supplied public information systems for Gatwick Airport and British Rail stations, has now installed the British Airports Information Retrieval (Bair) system at Heathrow. The software covers both Central and Terminal systems, including the microprocessor-driven flapboards and pier-gate subsystem.

Written in Coral 66 real time programming language, Bair consists of two separate program suites: one to run on the passenger terminal minicomputers, and a second to run on the main and standby Central machines.

Five minicomputers form the basis of the system, all Ferranti

Argus 700E models. The passenger terminal sector receives flight data from the central machine and controls the updating of the public flapboard and television displays. Each of the three terminals has the ability to take over the function of any of the others in the event of a machine failure.

In the Central system a database holds key files on flight schedules, active flights, group movements and accounts, which are updated by input from 16 VDUs. This will handle about 300,000 flight movements a year, and provide information for over 25 million passengers a year.

All the software runs under Vaughan's Master Control Executive (MACE) operating system, designed to minimise response times by having a common database and interface area with no overhead instructions.

p-System users' conference

FOURTH bi-annual USUS (UK), the UCSD p-System Users Society, will be held at the Polytechnic of Central London from September 9-11. Open to member and non-members, the conference will cover commercial, industrial and educational applications.

Cryptography tutorial

ADVANCES in cryptography is the subject of a tutorial by Pergamon Infotech, to be held in London from September 7-9, and presented by Dr Carl Meyer. Those wishing to attend should contact Pergamon Infotech at Berkshire House, Queen Street, Maidenhead, Berkshire.

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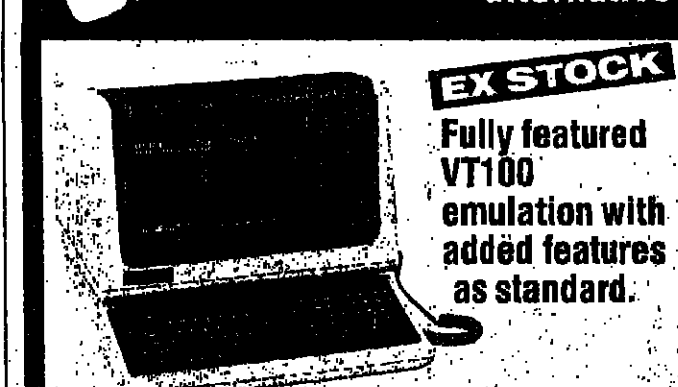
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Commitment in communications

Second half of 1982 'industry's low point'

IN our last issue we reviewed an optimistic report by Creative Strategies on the prospects for the microcomputer industry. Now it is the turn of New York stockbrokers Smith, Barney, Harris, Upham and Co., to peer through the short-term gloom and to discern grounds for medium-term optimism.

Smith Barney's analyst Peter Labé, while admitting that the second half of 1982 will be difficult to predict, notes that it is likely to represent the industry's low point in this cycle.

"The third calendar quarter is always tough in the mini business, with a normal seasonal summer lull in the US, and Europe quiet with vacations. Secondly, with Canada, the US and Europe in the doldrums and a weak capital spending outlook generally, a rapid turn is unlikely and a moderate economic recovery next year is as much as we should expect."

Labé, never one of Wall Street's doom merchants, does say that the microcomputer industry no longer has the growth prospects in the 1980s that it had in the 1970s. The reasons he cites for this are "mostly because of the micro and the improved position of mainframes."

Historically the major companies in the microcomputer field, and there are now over 70 in the US alone, have achieved double digit growth. And the average



HENSON... tighter controls at Prime.

Hong Kong woos UK computer companies

HONG KONG, one of the most unfettered and successful capitalist economies in the world, has been eyeing its representation in London, and is encouraging UK companies to start up manufacturing in the Crown colony.

So far no announcements have been made by any enterprising UK computer companies planning to set up on China's doorstep. But the Chinese themselves have wasted no time in taking up the new incentives.

A joint venture has been established between two Hong Kong companies and a group from the People's Republic of China.

Called Sino On Line Ltd, the new company plans to help boost exports of Chinese microcomputers and to import technology from the West.

Most observers are sceptical about the micro export angle. Few people have seen much of China's electronics industry, and those

who have say that in manufacturing terms it is 10 years or more behind the West.

In the laboratories many state of the art developments are in progress, but with no developed domestic market and the formidable problems of the Chinese language, little is thought to have happened in mass production terms.

China has developed an economic zone in Guangdong Province around Hong Kong, and Commodore has established a plant behind the bamboo curtain.

Most of the work in the Commodore plant is manual, focused on the production of LED displays, but the company has produced a micro lookalike version of the Commodore Pet called an EYE.

This device is being evaluated in Peking, but so far there is no sign that China is about to become the next victim of the micro revolution.

Venture fund finds few firms to invest in

DESPITE intense activity in the UK in pursuit of good computer companies in which to invest, Venture Capital Fund's United-Computer and Technology Holdings remains lightly represented in the industry.

The company is publicly listed and raised over £2 million for investment last year. So far this has been sunk mainly in gilt-edged securities.

Company chairman Tom Buffet says that the building of the portfolio is proceeding much as he expected. But he admits disappointment over the low number of unquoted UK stocks so far acquired.

"There is no shortage of ideas in this country but in new industries it is difficult to identify the correct mixture of technological innovation and talent, combined with the more traditional commercial manufacturing and marketing skills."



De Castro... a potential takeover candidate.

Noting that Data General is the leader in 16-bit OEM minis, a position Labé thinks "DG would like to move away from", he says that non-32-bit business at the company is likely to fall by 10% for the rest of 1982.

From a financial point of view Labé continues to say that DG is ripe for a takeover. "At present the company is an asset situation, and perhaps surprisingly, no suitors are evident," he says.

"As of March 13 1981, Data General had net working capital of \$27 per share after deducting all debt, and this figure will be higher when the June figures are published. Included in current assets is \$139 million in cash, up to \$2 million since December 22. The book value of the company was approximately \$38 per share."

Labé's surprise is understandable if a number of characteristics that DG does not share with many companies are taken into account. DG, is uniquely the creation of its president, Ed de Castro. It is hard to see any new owner being able to live with de Castro as a subordinate, or vice versa.

The company, as Labé himself notes, was slow to get into the 32-bit market.

Problems loom for Prime, but no change in forecasts. Despite forecasts of increasing competition from DEC and other 32-bit suppliers, Labé maintains his prediction of \$575 million sales at Prime in 1983, a \$135 million gain on 1982's forecast \$443 million.

He traces the slowdown in Prime's growth pattern to the management changes last year, which have led to greater control, but no return to the growth of two years ago.

Labé suggests that Prime will introduce a series of terminals later this year, and will become more aggressive in vertical markets.

Joe Henson, Prime's new president, has focused much of his energy on stabilising the company's presence in the marketplace, particularly internationally.

Bureau's success was unforeseen

"THE extraordinary financial success of the company over the years was not foreseen." This comment from a brokerage firm refers to a small representative of that allegedly dying breed, the centralised service bureau.

The company, NMW of Nantwich, has recently cleared the decks for its long-awaited Unlisted Securities Market listing by giving all the shareholders one free share for every eight shares they currently hold.

Brokers Heselton Moss say that the NMW share price has been very disappointing this year so far, and outlines some of the reasons. A bid to acquire a microelectronics company to build the NMW designed HSD1 terminal was thwarted by delays resulting from a battle between the management and a small group of the founding shareholders, who still control voting shares in the company.

This tussle was eventually resolved by the one for eight issue, but NMW apparently lost out in the bid for a micro builder of its own and is still having the HSD1 built on a subcontract basis.

NMW's managing director Brian Johnson says that 20 clients already have their HSD1 in use and installation is going well.

NMW is a specialised bureau which handles share transactions on behalf of stockbrokers. The company was set up in 1970 and now handles 35% of all share transactions carried out on the Stock Exchange.

NMW hopes to list its shares on the USM in November. Last year the company made a profit of £544,000 pre-tax on turnover of £2.3 million.

For five years NMW has been among the three most profitable UK computer companies, according to brokers Greene and Co.



JOHNSON... "Going well."

Fund buys into Sord

UK venture capital fund Abingworth was one of only three non-Japanese institutions to obtain shares in the first stock placing by Sord Computer Systems in Tokyo.

The two other funds are believed to be American, and the non-Japanese investors are thought to have about 30% of the 30,000 shares issued.

The placing was a private one, led by Nomura Securities, and was heavily oversubscribed despite the fact that the price asked, 70,000 yen for the 500 yen share, was the highest ever asked and paid for an unlisted company's shares.

According to Sord company president Takayoshi Shima, the money will be used to fund the building of a new eight-floor factory in Tokyo, which will more than treble Sord's production capacity.

This has recently been increased by the addition of a new factory in Singapore and the purchase of a seven-acre site in Dublin for an expanded European production centre.

Shima has long been ambitious to make Sord a Japanese Apple.

MICRO NEWS Software support for Intel 432

DEVELOPMENT support for the IAPX 432 32-bit microprocessor has been introduced by Intel. A cross development system, coded 432CDS, will provide software development support for IAPX 432 chip and board level products, allowing programs to be developed on a VAX 11/780 host minicomputer.

The package includes hardware and software products, and is designed to support large scale development projects. Typical uses seen for the 432 chip set are information management applications, involving lots of programming, and the CDS can support eight to 12 programmers working jointly on a project.

Co-ordination of different software modules is managed by the development system. Hardware products from Intel contained in the package include the System 432/670 execution vehicle - a computer based on 432 prototyping tools which executes compiled code under the control of an Intellex Series III microcomputer development system.

Software includes an Ada compiler and a version-checking linker (Link-432) which run on the host VAX mini. A system level debugger (Debug-432) and a revision utility (Updat-432) run on the Intellex Series III and there is operating system software (IMAX-432) and diagnostics (DSP-432) for the execution vehicle.

Intel is also pushing software support for its IAPX 286, the next main step in the 8086 16-bit family. A development package including a macroassembler, a symbolic debugger and a system simulator, is being delivered, as is the PLM-286 high level language. Pascal-286 and Fortran-286 are due early next year.



PANTON... Users are looking for a "Rolls Royce" support service.

Telecomputing back in the micro business with IBM Personal

TELECOMPUTING of Oxford has joined the rush of would-be dealers for the IBM Personal Computer. Since the break-up of its microcomputer company Telecomputing Systems following an acrimonious law-suit with hardware suppliers ECS Microsystems, Telecomputing has been casting around for a micro to handle as a second string to its ICL teleprocessing software business.

Now it seems to have settled on the IBM Personal Computer, which it is putting on to the market with a three-pronged attack. The machine is still not available through official IBM channels in the UK, though moves from IBM are expected next month, and the supply of units to the UK relies on "grey imports" of the US model.

Telecomputing itself has set up a new company, Telecomputing Centre (Oxford) Ltd, which has the main aim of increasing awareness of the machine among potential users, but will also sell

hardware to customers. It will not import the machines directly, but get them through a Manchester-based company, Duxiver.

Duxiver was set up a year ago, staffed by ex-employees of Telecomputing Systems from the top down. It took over Telecomputing's ECS Microsystems business, providing maintenance support to existing ECS users and supplying further systems.

Because of this base of old customers, Telecomputing has a direct holding in Network Designers, but Telecomputing managing director Bernard Panton and technical director John Garrick are both directors of Network Designers.

"Now that the micro industry has begun to stabilise, users have become more discerning and are looking for a company which will provide a 'Rolls Royce' support service," says Panton. "The Telecomputing Centre has both the experience and the team to provide that service."

which turns the Personal Computer into a CO3-compatible ICL terminal.

And Network Designers is the third prong of this attempt to establish Duxiver and Telecomputing as the sort of dealer IBM would want to appoint in the UK. Like Duxiver it is staffed by people from the old Telecomputing Systems. Director Tony Legge came to the company via Duxiver.

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IBM gets into the PC add-on act

THE boom in add-on cards for IBM's Personal Computer has at last got through to IBM. It has announced memory expansion cards to double the maximum user memory to 512 Kbytes and a prototype card to assist users in developing their own customised attachments to the machine.

Many companies have already had considerable success with add-on cards. Memory expansion options from the likes of Microsoft and Tecmar in the US have proved big business, and the feeling among industry watchers there is that IBM is aiming to maintain its momentum in the fast growing personal computer market.

The other type of bolt-on extra that is making its mark for the IBM Personal Computer is a card giving the machine compatibility with eight-bit CP/M programs.

Top US dealer ComputerLand has just bought 10,000 Baby Blue CPU Plus boards from Xedex, in a deal worth more than \$6 million.

Eight-month-old Xedex is hoping for more than \$15 million worth of orders for Baby Blues by the end of the year.

Closer to home, London-based Small Systems Engineering has come out with a version of its CP/M plug-in board to fit the IBM PC. It is much the same as the successful board for IBM challenger Sirius, says Small Systems' Derek Rowe, but with software and interface hardware altered for the different requirements of the IBM machine.

It is due to be launched officially next month, and is aimed mainly at the simmering European market for the IBM PC. So far this is only available here through unofficial imports by companies like KGB Micros and Duxiver.

"We are aiming primarily at Europe," says Rowe, "because we can offer the support here." He does not think imported US add-ons will compete on support terms.

"But we do hope to make good inroads into the US too," Rowe adds. He claims that the Xedex Baby Blue board only emulates CP/M, and is much slower than his card. The Small Systems' card also has the advantage of an interface for a Corvus hard disc system, which the Baby Blue and other US eight-bit CP/M boards lack.

The Sirius version of the board has found favour with the machine's manufacturers. Sirius itself is marketing it outside the UK, and this week begins production of the board in its Scott's Valley factory.



ROWE... Europe main aim.

Motorola and NatSemi take on gate arrays market together

TWO US semiconductor giants are sharing efforts to exploit the booming semi-custom chip market. Motorola and National Semiconductor will each act as alternate sources for the other's gate array families, and will provide compatible design automation systems for development of customers' designs.

While second sourcing is important to establish market confidence in particular components, as with any integrated circuit, the design automation link is seen as the more exciting aspect of the agreement.

Gate arrays are standard chips where the function performed is determined by the final interconnection layers, and CAD tools have become essential in tailoring this interconnection to fit users' needs.

The two companies will use the same design automation system to generate data tapes that either will be able to use to manufacture specific circuits.

It was built up by NatSemi, which linked major software blocks licensed from various suppliers into an optimised system. It runs on IBM mainframes, which both companies were using anyway before the link.

For a "nominal charge", customers will be able to have design information developed by one supplier transferred to the other through a compatible database tape interface.

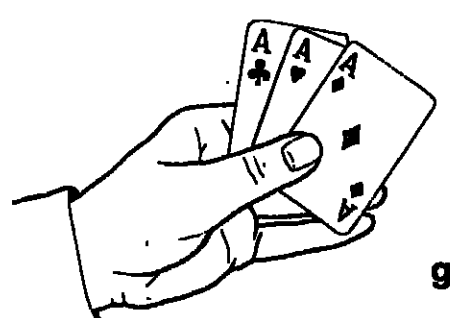
Customers supply logic diagrams and test patterns as basic information to input to the system, which then simulates the logic to check that the circuit will perform the expected functions. Then follows automatic layout of the integrated circuit and logic verification based on actual values of circuit parameters.

Customer access to the design automation system is through NatSemi's gate array design centres in Bedford and Munich and Motorola's European gate array centre, also in Munich. The numbers of design centres will increase as markets open up, and terminals will be put in at major customers' premises.

Part of the reason for the importance of gate arrays to companies like Motorola and NatSemi is a defensive one to protect standard products. The devices find most application in computers and telecommunications products, where a 2,000 gate array can replace as many as 70 or 80 medium-scale integrated circuits.

NatSemi's European marketing manager for gate arrays, Colin Clifford, sees the market split into two main areas. "There are those who want speed at any price, for mainframe computers and telecommunications switching systems, and go for ECL arrays. The rest are happy with something slower."

He believes the Motorola/NatSemi joint ranges span both these broad groupings. The Motorola-developed MCA series of bipolar arrays gives the high speed coverage, while NatSemi's 6000 series of CMOS arrays gives reasonably fast low power devices.



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GILB'S MYTHODOLOGY

Principles of Infotecture - 10

System design lacks a good common language

THE Tenth Principle of Infotecture states: "Written, structured, and quantified documentation about high-level information systems architecture (infotecture) is necessary to overcome the communication problems caused by system complexity, time and the many people involved."

We are constantly giving lip service, and sometimes real hard work, to documentation. Unfortunately, at best, it is not the most critical kind of documentation we usually worry about.

We have a tradition of worrying about our low-level detailed maintenance documentation, so that we can more easily maintain or enhance our present systems.

At the higher reaches of system architecture, where you are setting goals ("Availability = 99.9% of the office day") and identifying major technical strategies ("Develop totally distinct versions of the critical software") we have almost no common language whatsoever. Moreover, not many people appear to have recognised the problem!

One organisation which recognised the problem and showed an advanced understanding of it, was IBM's Santa Teresa Labs. The manager of inspections there, Ken Christensen, told me in 1979 that the company was unable to apply the deep and rigorous inspection method to several of the highest

levels of software design. It had to be satisfied with design reviews (which are roughly four times less effective) because inspection is a process that presumes the utmost in clarity and unique interpretation of the various levels of design which it examines and compares against each other.

If that clarity is absent, then the inspection process is correspondingly ineffective. It is rather like

"unfortunately they still lead to specifications that are as ambiguous as the English language."

We fail to write down fundamental aspects of our high-level design. Typically, we do not even write down all the critical goals of our projects: "hardly ever" is my observation. And it is just as partial or as bad at all other levels of design documentation.

We fail to structure our high-



Tom Gilb is an independent consultant, lecturer and author on computing topics.

related to these functional aspects of it?

One of our greatest and most consistent sins is that we make little use of our civilisation's greatest communication device - the use of measures and numbers to express qualities and resources required in our future systems, to express our experiences with past systems, or to express our judgment of a paper design specification.

I suspect that we will have to experience major tragedies before we wake up to the necessity of a consistently better practice in this area. We only really learn when all is lost.

But there are perhaps some people reading this who have already experienced their hard knocks and who are ready to emulate Ken Christensen in looking for better high-level languages for system design.

Tom Gilb

FOCUS

A turning point for the DPM

FOR some considerable time, turnkey computing operations have been hovering on the edge of the market, waiting for a helpful push, shove or favourable trading wind. Thanks to a combination of persistence, microelectronics and luck, the turnkey show is now well and truly on the road.

Turnkey manufacturers have had to persist in waiting for the business user to face the facts of computing technology life and accept the concept of the total solution. Microelectronics has given the turnkey operations a sizeable boost with basic office, shop and factory equipment capable of linking with central computing facilities. Luck came into it with the introduction of IT Year and the resulting promotion which has made many potential users more aware of computing possibilities and techniques.

The fact that turnkey companies in many cases have assumed the role of the DP manager is one which few industry commentators or even the IDPM appear to have grasped. The role of the DPM was often that of interfacing company requirements with available levels of equipment and technology and co-ordinating adequate teams of analysts, programmers and operators. Somewhere along the way, computing management had to acknowledge the presence of the users, assorted service engineers and vendors of computer supplies.

Far from declining, such DP responsibilities are in even greater demand as large-scale installations become more closely involved in datacom and telecom technologies with heavy layers of local - or not so local - area networks adding to the confusion. Fortunately, at least for the smaller user, full-scale technology is available without full-scale involvement, responsibility and hassle. One-stop shopping is available covering the requirements for a basic microsystem or a far from basic teleprocessing operation.

The total solution includes the provision of matching hardware and software, training and education, system support and service-back-up. Unsurprisingly, turnkey companies are now concentrating on meeting the needs of selected marketing areas rather than attempting to provide all things to all users.

Companies such as the recently established Saffronware Systems of London has announced its intention of marketing its turnkey operations to local trades people such as estate agents as well as the more traditional areas of law and accountancy. Semaphore Computers of Godalming, another notable turnkey operator, sees its turnkey operations areas as being those of supplying small or medium sized systems to companies which appreciate the benefits of computing technology but not the associated

costs and responsibilities normally associated with getting a computer.

Its selected trading areas include publishers and direct mail companies, builders merchants and the travel industry. Meanwhile the Riva Turnkey Company of Bolton, is, as its name suggests, a dedicated supplier of turnkey systems. Its chosen area is that of the retail and wholesale trade where point of sale equipment tills can be hooked-up to a central computer. As a result, traders obtain the best of all computing worlds - specifically designed and developed systems, state of the art technology and support.

The key to all turnkey operations is that of user involvement. While turnkey companies may have invented the term "user friendly", they certainly accept the principles involved even to the extent of encouraging the formation of user groups, a sign of confidence from the suppliers that they are meeting present requirements, and are willing to consider and respond to future demands.

In a computer world increasingly involved in specialisation, with even major system houses tending to concentrate in special IT areas, the pressure is on the turnkey companies to attract and retain personnel with the right talents and skills.

It does seem that the current discussions covering the future role of the DP manager could have overlooked one important factor. For those DPMs prepared to cross the line from using to marketing, a job in a turnkey company could provide an interesting career path. Whether planning installation, implementation, data preparation or operations, few are as well equipped to deal with the stress and strains associated with computing as the data processing manager.

Alan Simpson

HUMAN TOUCH

Where to find advice

AT EVERY level in a data processing project there is an element of management. Some people see management as the efficient use of resources. The easiest way of achieving efficiency is by making a selection from a wide choice. Having a wide choice improves the chances of finding a better fit between the resource and the requirement. A better fit should be more efficient.

Lining up a wide choice has to be done in a hurry when it is needed so it is a matter that always should be borne in mind. It doesn't take long to find what you need if you have prepared yourself with the appropriate contacts and reference books.

The Computer Users Year Book is in my opinion an excellent source of reference used widely for its salary surveys and its list of users. Few realise that it includes references to Japanese and Albanian character sets, lists of computer periodicals, computer types, supplies of disc pack storage units and financial service companies, to name a few at random. If the CUYB fails you then go to its list of associations and institutes for a lead to who else could help.

There are specialised directories for most trades in the same way that CUYB serves computer users. Beyond those directories, the British Computer Society has an information officer who can usually put you on to someone who might know the answer. The trade associations are always worth a try and both the AICS and CSA provide a service of circulating requests for specific skills round their memberships.

Cliff Dillaway

DOWNTIME

Well, it's one way to stop the conflict

I HEAR that US military chiefs are having great fun with a nuclear war simulation program called Janus, developed at the Lawrence Livermore laboratory. Nuclear fire balls and fall-out can be simulated along with mine explosions, incandescent forest fires and flattened towns in a pastiche of colour on a graphics tablet.

The "pretend" battles usually begin with conventional weapons, but many officers have a disquieting propensity to "go nuclear" (charming turn of phrase) when the enemy gains an advantage.

One officer indiscriminately picked the largest nuclear weapon from his tactical arsenal in a desperate bid to halt the insidious Russian Red Army.

His bid worked a treat. Red Army wiped out the map.

But the officer's elation was

short lived. The kiss of death pecked his face as a growing white circle on the graphics tablet indicated that he had wiped out all his own forces as well.

"Holy smoke," he commented,



How to get to the top

IN 1964 Robert Smallcombe, now president of Delta Data Corporation, showed us how he got where he is today. Then he was a mere manager at a newspaper printer, which was about to set up a computer department.

"You work with machines," said his boss, "therefore you will run the computer department."

Shocked, but flattered, our man knew what to do - and he wasn't going to do it himself. So he hired a DP manager.

An IBM salesman was invited round to display his hardware.

"Now here's a glossary of DP terms," said Smallcombe to his new DP manager. "Look through them and fire some of them at the IBM salesman tomorrow."

"Don't worry whether they mean anything, just make sure you get some of them in."

Our blue-eyed DP manager did this, and in due course the IBM salesman said: "Gee brother, you've been on one of our training courses."

Smallcombe tells me that from then on the IBM salesman spoke English to his DP manager.

On the right track?

CLIVE SINCLAIR not only leads Sinclair Research, the most prolific computer manufacturer in the world, but also is chairman of British Mensa, which contains some of the most intelligent people in the world.

He demonstrated his intelligence and eloquence at Mensa's Golden Ages symposium in Cambridge. "The most Golden Age of man's history may well lie before us, if we can only move in the right direction," he said.

Sinclair identified the golden ages of the past, including Augustan Rome and Elizabethan England, but failed to mention Thatcherite Great Britain.

All these Golden Ages share qualities in common that give people time to think, he argues. He names six such qualities, including peace, secured by superiority of arms and technology, and a surplus of labour, beyond the need to maintain the necessities of life. And beyond that a surplus of time for thinkers.

"Given all these elements the body of men arises which can turn its attention to matters other than necessities."

Euphemism for the decadent society? Surely not from Clive Sinclair who himself works so hard.

Basic facts

NOTHING is as simple as it seems in our universe. The moon does not revolve round the earth - both revolve round their mutual centre of gravity. The mind does not control the body, nor the body the mind - both gravitate about the soul.

Similarly there is not one teacher and one pupil, or 30 pupils, however many in a class. Teacher and pupils rotate about their common denominator of knowledge.

This universal fact can have unfortunate side effects, as pointed out by Ada guru, John Barnes. Senior decision-makers ignorant of data processing have got kids with ZX81s who learn Basic and attend computer summer schools.

This sporting life

COMPANIES are falling over each other in a mad dash to sponsor sporting events. The recent Royal Star & Garter Classic Polo and Celebrity Golf Tournament solved this problem by giving several companies a slice of the turf. One of them, communication systems, had to be content to sponsor just one hole - the second one.

Difficult to see how companies are going to make much mileage out of such diluted sponsoring - unless they find sympathetic journalists willing to write about it.

Cleaned out

"WHAT has happened to the UK office systems companies that once promised to sweep the board and demolish the giant US corporations such as Wang and IBM that dominate their market?" asked a colleague.

"They never did sweep the board and now they are sweeping the street," replied the harassed cynical hack.

Chad

Computer Weekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, August 26, 1982

Technological blind alleys

ONE of the besetting sins of the computer industry has been its eternal preoccupation with technology. Historically, progress was measured in technological terms, with the first generation valve-based computers giving way to their transistor-based successors which were in turn replaced by computers using integrated circuits.

Since then technological progress has been by evolution rather than revolution, and the only fundamental change was the replacement of ferrite core main memory by MOS chips in the early Seventies.

That has not stopped people from pursuing all sorts of technological red herrings. Bubble memories, charge-coupled devices, plated wire memories, holographic memories and Josephson junctions are just some that come to mind. To be fair, not all have been totally unsuccessful, but all have been blind alleys leading away from mainstream development to nowhere in particular.

The latest buzz phrase to enter the computer professional's exponentially increasing esoteric vocabulary is gallium arsenide. IBM, Univac, AT&T and a number of others are said to be spending millions of dollars on the stuff, searching for yet another panacea to computing's problems.

Gallium arsenide (GaAs) is, like MOS, a semiconducting medium but using completely different raw materials. Its attraction is that it offers a potential improvement of a thousandfold in operating speed over MOS.

Given that potential equals actual and that the cost is more or less the same, there would be a case for it. But gallium arsenide is still a research lab technology, with who knows what production snags to come, while in contrast there is a 10-year-old multi-billion pound industry heavily committed to and knowledgeable in the production engineering of silicon chips.

Bearing this in mind, can gallium arsenide possibly be worth the effort? What computer manager would name lack of processing speed as a major constraint on his operation?

It is perhaps worth pausing a moment just to consider present day processing speeds. They would stagger Turing, von Neumann, Mauchly & Co: the fastest processors have their cycle times measured in units so small that a new word - picosecond - has had to be invented to describe it.

There are a thousand of those in a nanosecond, and even a nanosecond is so small that a ray of light travels less than a foot during one. An electronic pulse, not being a massless particle, travels considerably less. Can it really be that real improvements in computer performance worth having can be gained from expensive research into this area rather than into the computer's more obvious deficiencies?

One thing to be said for the Japanese fifth generation concept is that it does at least attempt to address just those obvious deficiencies. Computers have always been difficult for non-specialists to understand, let alone to use, and the natural language information base intelligent machine is attractive because it solves this problem at a stroke.

The trouble is, that's only in theory. And because it completely discards all our hard-won knowledge, understanding and development of the von Neumann computer, it very much throws out the baby with the bathwater.

We don't know that problems the fifth generation is going to throw up, because it is so far only a concept, and ignorance is bliss. Hence all the enthusiasm.

The really practical developments that are worth keeping an eye on are those which accept the von Neumann computer as a starting point, warts and all, and attempt to dispose of the warts.

Univac, for example, one of the riders on the gallium arsenide bandwagon, has developed an innovative and probably unique software product called Mapper. It is designed to enable non-specialist people to find their way about an 1100 database, design their own reports, create their own files, and even develop their own systems if they wish.

With products like this, it's difficult to see why the company is bothering with will-o'-the-wisps like gallium arsenide.

1984 and all that...

THIS week's example of the strange things people say about computers was sent in by C. Griffin of Sutton Coldfield, who wins £2.

World War II was a time when computers were booming.

School exam paper.

LETTERS

Videotex for travel agents

THE RECENT report of the Travel Association's Consultative Council highlighted that travel agents are faced with a bewildering choice of competing computer systems and, as a consequence, are "stalling not buying."

A way out of the dilemma is perhaps to treat front office and back office functions separately and not launch straight into integrated reservations and administration systems. New technology - in particular, videotex - is offering agents a low-cost solution to reservations handling.

The sensible approach for the agent might well be to start with videotex TV-to-computer reservations and subsequently to "bolt on" other goodies such as video and microcomputers to handle payroll and accounting systems.

Despite the considerable take-up of Prestel by the travel industry compared to other industries, the number of sets installed is still very low compared to the potential market. Recent figures show 2,815 sets in 2,150 travel outlets, whereas the immediate potential has to be five times that number (4,500 travel agents with three sets apiece). Add keyboards, printers and other add-on equipment and that's a huge market on which the industry has yet to capitalise.

TIM RUNDLE
Sales Development Manager
Thomson Holidays
London NW1

Bitter taste of TOPS

I WAS pleased to read your major feature on education and the computer industry (CW, August 5).

Six weeks ago I finished a TOPS course, along with 11 other hopeful future programmers. Only three of the 12 had been offered positions while on our industrial attachment, leaving nine of us to go and join "Maggie's Army". After only a few days it became apparent that the industry and its employment agencies have a blind bias against trainees, especially TOPS students, with no regard to the quality of the particular course attended. On one occasion I phoned a prospective employer to experience a hasty "TOPS? Huh!" and the receiver at the other end was thrown down, leaving me with not only a quiet line but a depressing silence in the gut.

Having given up a well-paid, good but boring position to enter a career in which I have often proved my aptitude but with no previous takers, the TOPS course was the ideal answer. It appeared to stand to reason that if the government were prepared to pay £5,000 to £6,000 in training and benefits to put me through the course, then both the government and I would gain from it. Not so!

One also wonders whether the 25% level of success (?) is achieved on all the courses given. How much is the country prepared to pay out to create unemployed programmers whose basic, but enthusiastic and in most cases intuitive,

skill will fade away in proportion with intake of Valium required to suffer this environment.

Three questions must be answered therefore: Are the courses designed to meet the needs of the industry or just to pass exams? Do the employers require educating in the "goods" offered at the ends of these courses, some of which are excellent? Does the Manpower Services Commission fulfil its responsibility to the taxpayer when it waves goodbye to the students at the end of the course, regardless of their employment status, or should a few pounds more be spent to create contacts to ensure 100% employment?

At last the media is putting these questions forward. Further help with cheaper advertising rates for trainee positions, cheaper agency rates and more pressure on the government and the industry may prevent further disillusionment.

It's not only the students who are losing from this situation but also the whole of British industry, as these new staff with new approaches, new ideas and up-to-date training are thrown on the scrap heap.

R. D. HILL
Pitsea
Essex

International IT centre

I WAS interested to read (CW, July 29) of the plans to establish an international information technology market centre in Boston. I'm very happy to be able to tell your readers that, once again, we in the UK are ahead of our international rivals, and particularly the Americans.

The Milton Keynes Development Corporation is in the process of establishing a major information technology centre in the city, part of which will contain a permanent exhibition centre which is intended to do just those things referred to in your article.

As a growing centre for the application of information technology, both in office applications and in industry, the city is attracting interest from both across the UK and overseas. With this in mind our intention is to set up an exhibition centre which will enable companies which are not already sited in Milton Keynes to have a shop window.

One up for the Brits!

ERIC BIRD
Manager
Information Technology
Exchange
Milton Keynes

Extraordinary maths

"ARNOLD ARNOLD is not an ordinary name. Neither is the man" (CW, July 29). And neither is his mathematics.

The maths is extraordinary because (a) it claims fantastic modelling capabilities, but we only have A.A.'s word for this (I'm surprised that Philip Hunter should make excuses for A.A. when he says he was not shown the mathematics); and (b) the little that we are shown does not model what A.A. says it does.

The first player in a noughts and crosses game does not have nine choices for his first move. He has nine empty spaces where he can

put his O or X but because of symmetry there are only three different places (centre, corner, centre-edge). Then depending on where the first player has placed his mark there are either two or five different places for the second player to place his mark.

A.A.'s analysis of 25 choices for the first player and 20 for the second does not model the number of choices presented to each player but rather the number of empty spaces presented to each player throughout the game.

LEONARDO BOTTACI
Cybernetics student
Brunel University

VDU radiation levels

I WAS disappointed to read the article by Howard Kartzen, based on a report from Vancouver that VDU users were putting their pregnancies at risk (CW, July 29).

If VDUs were damaging to pregnancies then it could only be because of radiation emission. Without information on the type of display used in Vancouver, or their age and state of maintenance, I cannot comment sensibly.

However, I feel able to reassure users of equipment of current manufacture from reputable sources that there is no such risk. I rely on the survey carried out by

the National Radiological Protection Board on behalf of the Health and Safety Executive. The conclusion was that "the radiation normally emitted from a VDU does not pose a hazard to operators either in the long or short term".

If we are to compete with other nations we must not be disadvantaged by employees being threatened by and exposed to radiation and allegations unless backed by careful evidence.

Dr G. HIRST
Chief Medical Officer,
International Computers
Putney

Lieware File

by Don

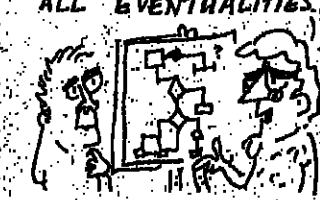
THIS IS MY WILL-WRITING PROGRAM...



...INTO THE PROPER JARROUN!



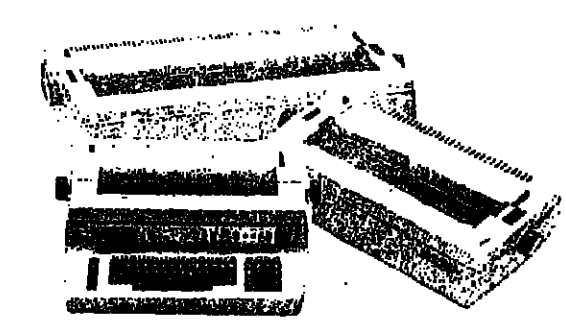
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Dr. J. H. Hirst

Anything over 2secs is a slow response

WHAT is a good response time? The answer depends on the application, and can be anything from one second to 24 hours. An operator submitting a batch of transactions may be only too happy with a response time of five minutes while he has a smoke and cup of coffee.

The programmer sitting at his terminal, however, demands much faster responses, certainly no longer than four seconds and preferably under two.

In a typical session, several hundred responses may be called for. The difference between two and five seconds per response then multiplies to many programmer minutes - not to be sneezed at, especially if he is a contract programmer, earning £10 an hour or so.

A most unscientific Programmer's Page poll elicited that 1.7 seconds is the average response time required by programmers. Most would settle for two, as confirmed by Computer Technology (CTL) which makes Momentum, a real-time system based on its 8000 Series machines.

"Most people put in a requirement spec that expects responses to be within two seconds most of the time and not more than five seconds," says a CTL spokesperson.

Nick Wenman of Philips Data Systems, which has recently put a new software development aid called Maestro on to its P7000 microcomputers, agrees, although he goes one second better. "All editing response times on Maestro are less than one second," he says. "A search may take more than a second, but if you are changing something, or paging through a file, response is usually immediate."

CTL also claims a response time of less than one second for its 8000 Series.

Wenman tells of top secret IBM research aimed at "sub-second" response times, but my enquiries failed to evoke any hard facts.

The Maestro available from Philips is established as a European standard development tool and was put together by Softlab in Germany. The idea is that program development is removed from the main production computer, on which a variety of debugging and editing tools are available. There is single key reference to system and program specifications, and structure diagrams, as well as higher level facilities such as a management project control system.

Softlab chose the Philips P7000 for this dedicated work - the key

to Maestro's success, says Wenman. "Alongside the processor is a video generator board constantly generating TV signals to each VDU, up to 24 altogether," says Wenman. A part of main memory is dedicated to the VDUs, split up equally between them.

This gives a near instant echo on the screen of the contents of relevant files, and at the same time anything on the VDU gets back to the processor almost instantly.

In effect the programmer has a window on his file through which he can tamper directly with its contents. The usual input/output buffer between terminal and processor is eliminated. As a result, screen manoeuvres can be performed at near disc transfer speed, says Wenman.

CTL also eliminates input/output buffers with its screen-based editor. Here the system mirrors movement of the cursor on the screen to keep response times below two seconds, often under one.



Programmers require an average response time of 1.7 seconds.

Response times are a problem with clusters of terminals competing for time on a single line. When the number of terminals on a single processor exceeds a critical level, responses can suddenly become unacceptable.

To meet this problem, CTL uses a Cluster controller, which can pretend to the system that it is an operator, generating input character sequences.

These it sends from each VDU on the cluster simultaneously and then displays the output on the relevant screen to measure the response time.

As far as the user is concerned,

response time is the interval between hitting the key and receiving the computer's reply on the screen. Yet many response time measures only allow for time taken for the central processor to make its reply.

Harwell Research Laboratories have therefore developed a tool called Snapi to measure the total response time of IBM networks.

At present IBM uses a TP monitor to measure the time taken for signals to return from the central processor. But there is also the time from the terminal to the TP monitor. "With a heavily loaded cluster of terminals, this could go

up to 10 seconds in fact," says Ken Gell, who led the development team at Harwell. "Snapi allows users to check a speed of line and the time terminals to a cluster."

Gell admits that Snapi has been a commercial success. "This is because users do not spend money on small tell them they are going to spend more money," he says.

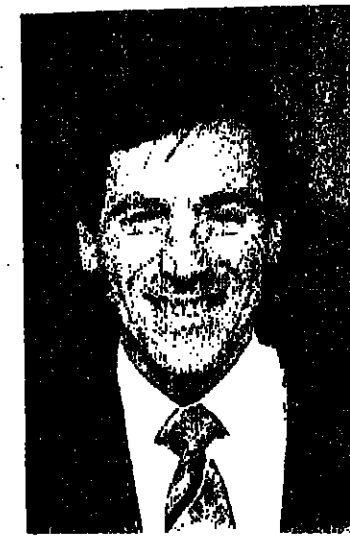
But as IBM networks get larger, terminal delay going to become more significant.

Then Snapi will come in its own.

OP SPOT

The ops manager is rarely given vital facts about his firm's future. But he must still plan effectively, says Brian Pugh

Top managers in desperate need of advice on DP policy



The author, Brian Pugh, is an operations manager with more than 10 years' experience on a major IBM site.

ONE OF the many duties of an operations manager is to participate in planning exercises for future requirements. The two principal areas of concern are capacity and manpower planning. The degree of involvement will obviously vary within each installation, but it should be a very high one.

Traditionally all forward planning has been done by looking at historic trends and then assuming that these trends will continue with minor adjustments for any known changes in the relevant factors. In DP, even with the absence of corporate strategies and long term projects, history will show a continual increase in the demand for CPU power and disc space.

Prior to 1980 it was possible to get away with this kind of forecasting. Through the troubled 1970s with productivity falling and inflation rising, the demand for processing requirements continued to

rise. Although belt-tightening became necessary companies appeared to be holding their own. Since then, however, events have taken a dramatic turn.

Industry is being slimmed down and restructured. Low level skills are being automated, and high labour content work transferred to the sweat shops of the Far East. The effects of all this are felt, directly or indirectly, throughout every company.

Against this background, forward planning is still essential to ensure that users are provided with the service they expect. In order to carry this out a more radical approach is required incorporating a more comprehensive set of pointers.

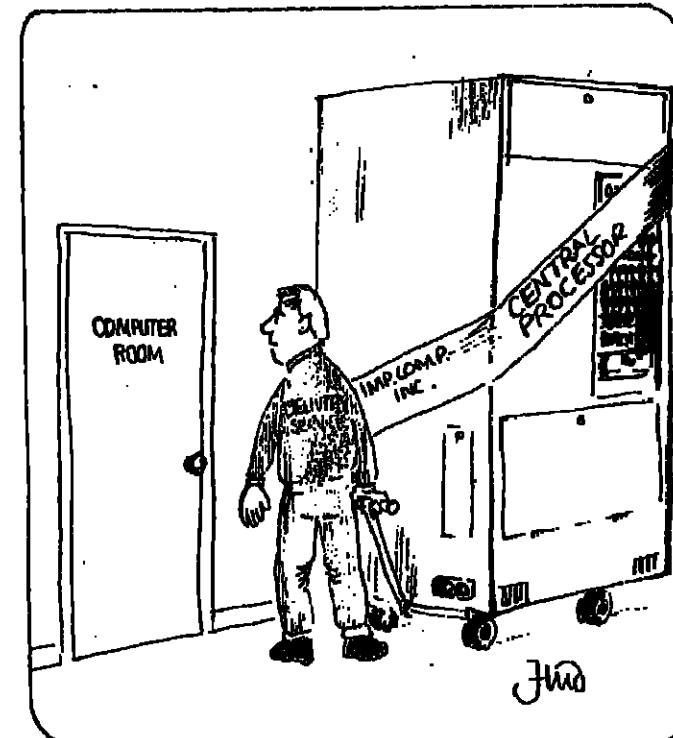
Unfortunately, DP departments have made things more difficult for themselves by failing to make sufficient impact within their own companies. Very few organisations have, as a serving member of their

board of directors, a DP professional who can advise them of the impact the state of the art can have on management goals.

Where a company has a long term business strategy very little information concerning it is passed down the line to the DP manager to help him shape his plans. Whatever is available to him is often restricted to existing and possible projects. Most projects give little indication of the ultimate destiny of the company, planned or otherwise.

Again the DP department must take the blame for this state of affairs. Fifteen years ago, or more, there were golden opportunities to impress upon management new techniques and new ideas, to show them better ways of running their business - to instil a new dynamism in decision making.

Today because of poor system design, bad implementation and lack of imagination, many installa-



tions do not enjoy the confidence of their directors to act as advisers on the critical aspects of running the business. The majority of the systems are simply computer-based replacements for those which were originally clerical or mechanical. However integrated these may be they can only be regarded as the first phase of the more innovative approach that is urgently needed.

In spite of management education in computing fundamentals and appreciation courses, top management still has no better idea of the potential of data processing than it did in the 1960s. It desperately needs to be advised so that it can plan corporate objectives which, in turn, can be translated into a DP policy on which, ultimately, capacity and manpower planning can be based.

If your installation is one of the many that failed to seize its chances in the past it is not too late to retrieve the situation. But you and your colleagues must be prepared, in the first instance, to take the initiative without management help. Once you have demonstrated your capability to plan and be ready for whatever demands are subsequently required of you then confidence in your organisation will grow.

The first is to try to predict the future course of the company, even if management does not appear to know.

It is assumed that you are aware of your company's products, the markets it is operating in and the strength of the competition. You should also know the share of the market, and thus your own position in the league table of companies providing competitive services.

Bearing in mind that it is impossible for a company to stand still - it either goes forward or backwards - try to establish where it will be in five years time.

Products do not last for ever. Some are made obsolete by new ones and some die because there is no longer any profit left in them and the company switches its investment elsewhere.

Talk to members of your sales force. Listen to their opinions, check them where possible with the financial facts from the accountants. Try to detect the phasing out of old and the introduction of new products or services. Look for problems that could be solved by the use of data processing or data capture.

Read the company's annual report. Look at trade directories for statistical data relating to the product, its market and number of competitors. Obtain copies of their annual reports.

Look for changes that tend to occur by default rather than planning. If your company is making a loss you can often predict long before they occur.

If your company were taken over tomorrow, who would do it?

If it were a competitor, what would happen to your department? If there were a competitor big enough or strong enough to take over, would the Monopolies Commission allow it? Would it be somebody outside the industry, if so who? Who has the financial muscle to make a bid? What assets does your company have to make it attractive?

These are the sort of questions the operations manager and his colleagues should be asking when looking to the future. The answers can be found within the company, by reading the trade Press, the financial pages of leading newspapers and investment journals.

When you have carried out this exercise you should have a clear

Try to predict the future course of the company, even if the boss does not appear to know

idea of all the possible options open to your company, even if your directors haven't. Of course you will not know which of them will happen, but you may be able to categorise them into the most likely, probable and possible.

Then you can look at current developments and new DP products to see if they will fit or assist in the future shape of the company. The advent of improved communications networks using X Stream Digital Services or fibre optic cables will make a big impact on decisions concerning the distribution of processing and data input over long distances.

Local area networks are leading to the distribution of processing within the same site. This concept will be further enhanced with the availability of micros with main-frame communication features.

Whatever conclusions and decisions you come to remember that change is the order of the day. In the business world changes are wrought by shifts in the economy, by technological advances, by takeovers, management buy-outs or changes of top management.

In DP change used to mean improved cost performance for familiar boxes. Today it means a choice of bewildering alternatives with many paths leading to the unknown.

In these conditions the keyword is flexibility. The ability to respond to change and take advantage of opportunity. Therefore it is preferable to keep hardware on short-term rental or lease, if you can find it, on short-term lease, and above all be very wary of so-called flexible lease.

While the future may appear to be unpredictable, the consequences of getting it wrong are not.

Who's dedicated to maintenance?

MANY programmers begin their careers in software maintenance in the belief that they can learn from code already written, and at the same time do least damage. Both beliefs are false. Existing code is seldom perfect and any imperfections will only be amplified by a trainee programmer.

Another chore commonly lumped on the hapless trainee is documentation of large chunks of turgid incomprehensible code. This fate befell me early in my lacklustre programming career, and such was the mess I made of the job that I was lucky to escape the sack.

Some people argue that the answer to maintenance problems is to have a team dedicated to it, and statistics can be produced to back up their case.

Certainly, with a dedicated department, less time is lost exchanging information. Some companies run special teams of test and maintenance analysts who file error reports and pass them up to the programmers for implementation. The turnaround on this can be staggeringly slow - at one place I worked it would take an average two weeks for a bug to be confirmed fixed after its initial detection by the test analyst. No way to work.

But a dedicated maintenance team? I doubt it. Maintenance need not be boring, but I don't mind betting it brings on lethargy if over-indulged.

The most successful programming team of my limited experience made no distinctions between its members. Everyone was involved in a little systems design, a modicum of detailed program design, and a dose of coding, testing and maintenance.

A holy blend it turned out to be since it gave a broader view of life and left people feeling used and wanted.

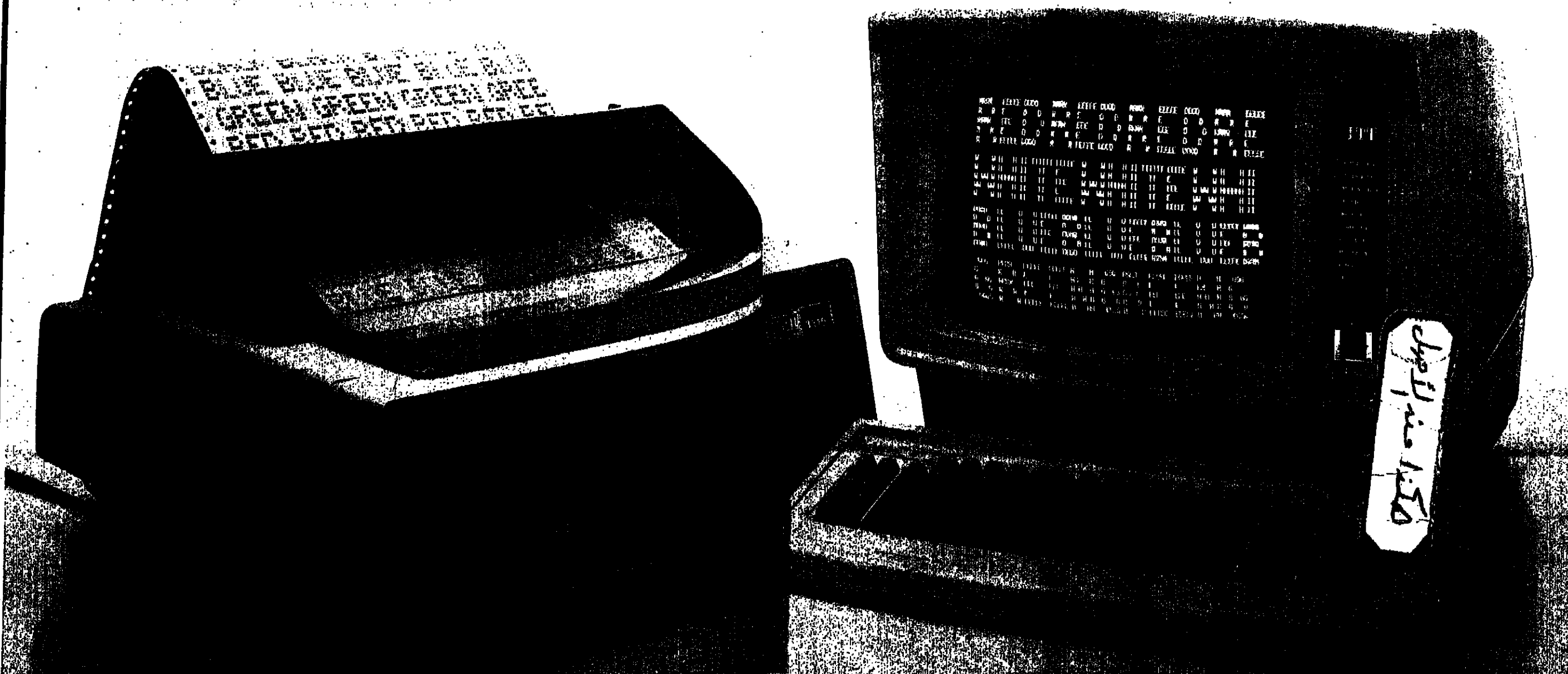
There was an emphasis on standards, which made maintenance a whole deal easier. Most subprograms contained less than 30 lines of code with as many comment lines, as well as a brief description of what was going on.

Maintenance was therefore a simple matter of matching what the program specification said the code did with what happened when the system was switched on - at least that was the theory.

The trouble was that the system specification did not match with what the client thought he wanted. Nobody had bothered to ask.

Moral: It is useless maintaining software that nobody wants.

We put a little extra into our terminals so you get a little extra from your operators.



One look at ITT's new 3289 VDU and 3310 printer should colour your judgement.

That's because they give you four colours instead of just one. Which will certainly brighten up your operator's results. The VDU will give you red, blue and white, in addition to the usual light green, on a dark green background.

And the printer gives red, blue and green as well as black. Not surprisingly, colour makes it easier to understand data, and therefore increases your operator's productivity.

It also makes the training of new operators a lot easier. Of course you can use different colours to code information. And they'll even work in the usual way if you want them to.

Both terminals are completely IBM compatible. The ergonomically designed VDU has a non-glare screen with multiple cursor styles and a cursor blink rate. And it goes without saying that both VDU and printer are extremely reliable.

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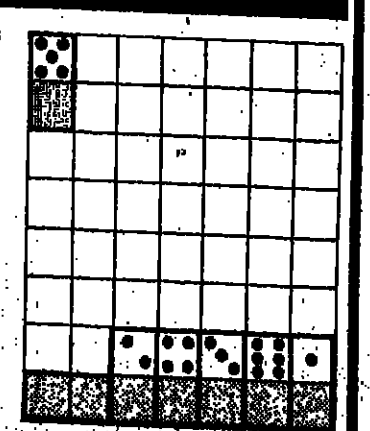
To: Barbara Pearson, ITT Business Systems, Lion Buildings, Crowhurst Road, Hollingbury, Brighton, Sussex BN1 8AN.

PUZZLER

THIS week's puzzle involves laying out a complete set of 28 dominoes on an 8 x 7 grid, to make a Magic Square. In order to produce the requisite "square" the bottom row of this matrix is to consist of "blank" domino-halves.

The seven dominoes incorporating blank-halves (with the halves shown shaded) are already positioned here on the grid. The blank-blank piece is lying horizontally, and the other six vertically.

The problem is to place the remaining 21 dominoes either vertically or horizontally to fill the empty spaces, in such a way that the spots-total is a Constant 24 for each of the seven "active" horizontal rows, seven vertical rows, and



Two main diagonals. See page 39 for solution.

Manager for govt IT training centre

THE new Milton Keynes Information Technology Centre (ITEC), has appointed Peter Loud as manager. The centre was set up by the government to help unemployed youngsters gain work experience and training in new technology.

Loud was formerly a senior research engineer at Loughborough University's Institute of Consumer Ergonomics.

ITEC is mainly funded by the Manpower Services Commission and the Department of Industry, although local sources of funding are also being sought. In October it will take on 30 people between the ages of 16 and 19, who have no formal qualifications, and train them in the use of electronic office equipment, computers and basic workshop electronics.

They will be paid a weekly fixed allowance, and be expected to attend during normal working hours. Recruitment is carried out through the local careers office.

Ray Pottinger has been appointed management services manager at Commonwealth Holiday Inns of Canada (Chic). He will be responsible for the introduction and development of computer-based systems. He has been with the company since 1977, when he joined as systems accountant.

Brian Hammond has been appointed information services manager at Unichem, the UK's largest pharmaceutical wholesaler. He has been in DP for over 18 years, and previously worked for Whitbread, EMI, Philips and NCR.

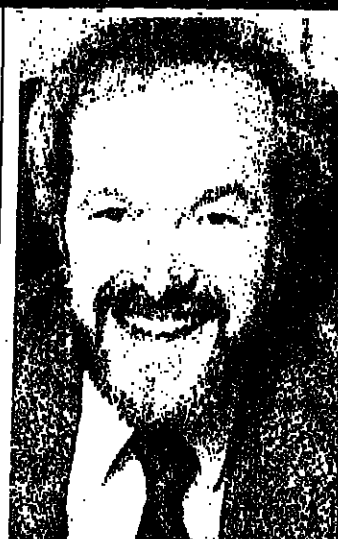
Philip Burton, formerly an external consultant to Ferranti Computer Systems, has joined the company as divisional marketing manager at the Bracknell division.

Brian Coe has been appointed marketing director at Radio Rentals. He joined the company as an engineering apprentice and served latterly as head of marketing.

William Michalek has joined Brown Disc Manufacturing based in Colorado Springs as director of marketing. He was formerly with Control Data.



Nick Coombs has been promoted from UK sales manager to general manager at components firm Burr-Brown. He joined the company in 1976 as a senior sales manager, and was later appointed regional sales manager for the Eastern area of the UK, and Scotland. Before joining Burr-Brown he was a sales engineer at Analogic.



Walter Hayford has been appointed managing director of Triumph Adler's UK operation. He has been with the company since 1979 and was previously general manager. Before joining Triumph Adler, Hayford was financial director and a shareholder in Robophone, a company that is now owned by Exchange and Telegraph.



Freelance microsystems consultant Wayne Moulder has joined Grundy Business Systems as the company's adviser for the NewBrain portable microcomputer. Two years ago Moulder was involved in setting up the microcomputer division of Leasco Software, which later was to become Grundy's first NewBrain OEM customer.



Sandi Davies has joined Paces Software International as senior programmer. She began her DP experience as a graduate programmer at ICL. From there she went on a program with Datacil France and later moved to PMA Consultants a programmer. For the past two years she has been lead analyst at Red Xerox.



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c/w

DIARY

SEPTEMBER 8
OTL Gives Voice to Information Management. Meeting on OTL's Information Management Processor, Institute of Information Scientists WP and computer information systems special interest group. OTL, London. Tel Helen Harris on 01-229 5069.

SEPTEMBER 14
Expert Systems. Speaker Alex d'Agapeyeff. IDPM West London to Oxford branch. Bell House Hotel, Bescosfield.

SEPTEMBER 19-24
Industrial digital and microprocessor-based control systems. IEE. Vacation School at Balliol College, Oxford. Details from IEE, 01-240 1871.

SEPTEMBER 23-24
Information systems – analysis and design working party. BCS. Open University, Milton Keynes. Details Guy Fitzgerald, 01-854 2030, ext 377.

OCTOBER 5
The impact of the new technology on management. Speaker David Fairbairn, director of NIC IDPM Scottish branch-British Institute of Management. Merchants House, 7 West Gony Street, Glasgow.

OCTOBER 6
Impact of new technology on management – challenges and implications of IT for the workplace. Speaker Ted Cluff, secretary-general IDPM. IDPM Scottish branch – Institute of Management. Lecture Theatre, College of Commerce, Aberdeen.

OCTOBER 12
Visit to Thames Valley Police Computer Centre. IDPM West London to Oxford branch. Thames Valley Police Computer Centre, Kidlington, Oxford.

JANUARY 5-6
Viewdata. Conference on the state of the art. Institute of Information Scientists WP and computer information special interest group. Details Mrs Bird on 01-645 2000 ext 8611.

COURSES

ADM has expanded its programme of microcomputer training courses, and is now running eight different courses on this subject. There are two new state of the art courses aimed at DP personnel – The Application of Micro Database and Microcomputer Communications and Networks. Other courses include: Microcomputers – A Technical Introduction; Microcomputers – A Systems Introduction; Microcomputers – Advanced Systems Design; Introduction to CP/M; and Advanced CP/M. Users are offered a three-day introduction to micros course, and the Basic language is covered by two courses, Basic Language Review and Basic Language Program-

ing. Details from Ron Humphreys on 01-863 0621.

BIS Allied Systems is presenting a three-day workshop for technical staff and management who require a view of the current local area network developments in information systems. Delegates will examine design and implementation techniques and application areas from a management point of view. The course also looks at the impact of LANs in the integration of the automated office. Cost per delegate is £360+VAT and the workshop will have its first presentation in London from November 16-18. Details from Cherry Bignore on 01-261 9237.

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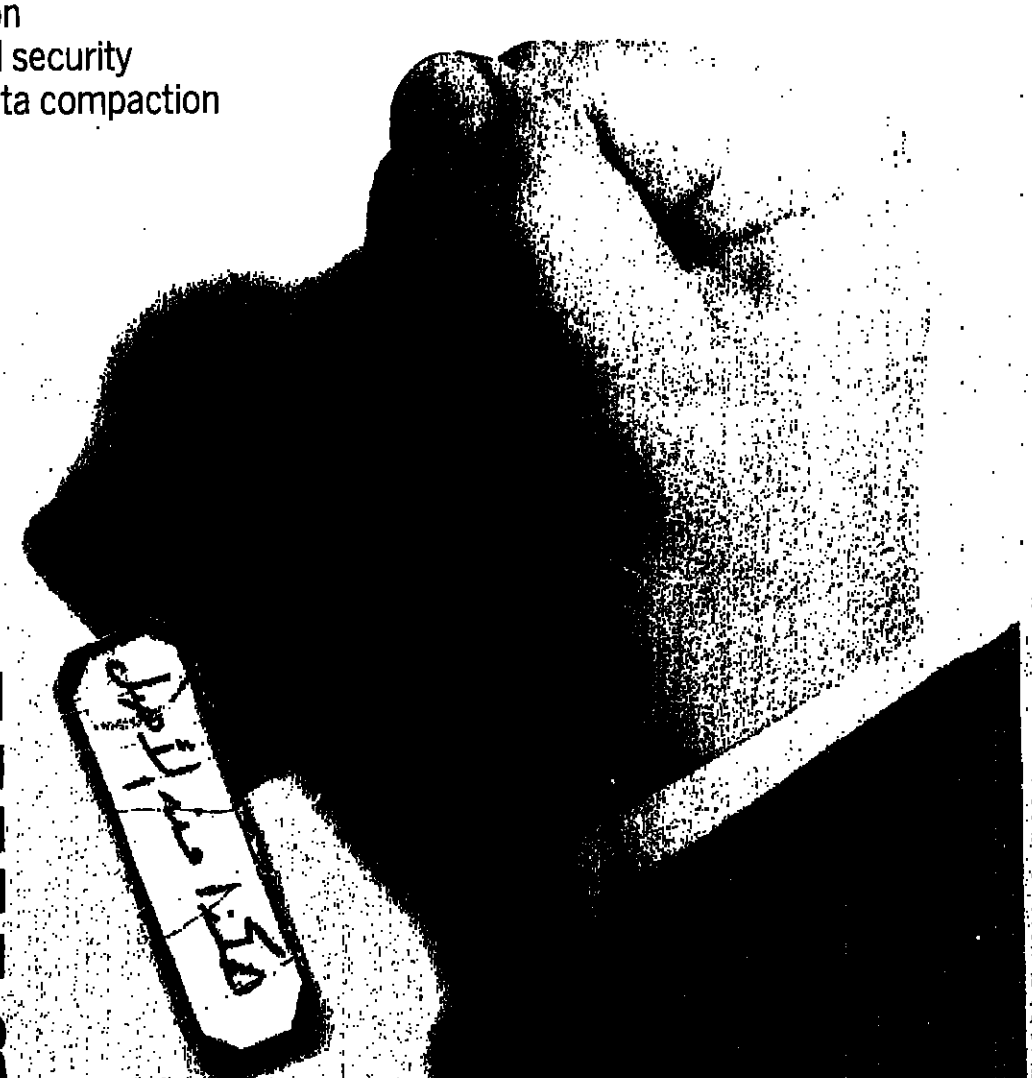
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Company _____

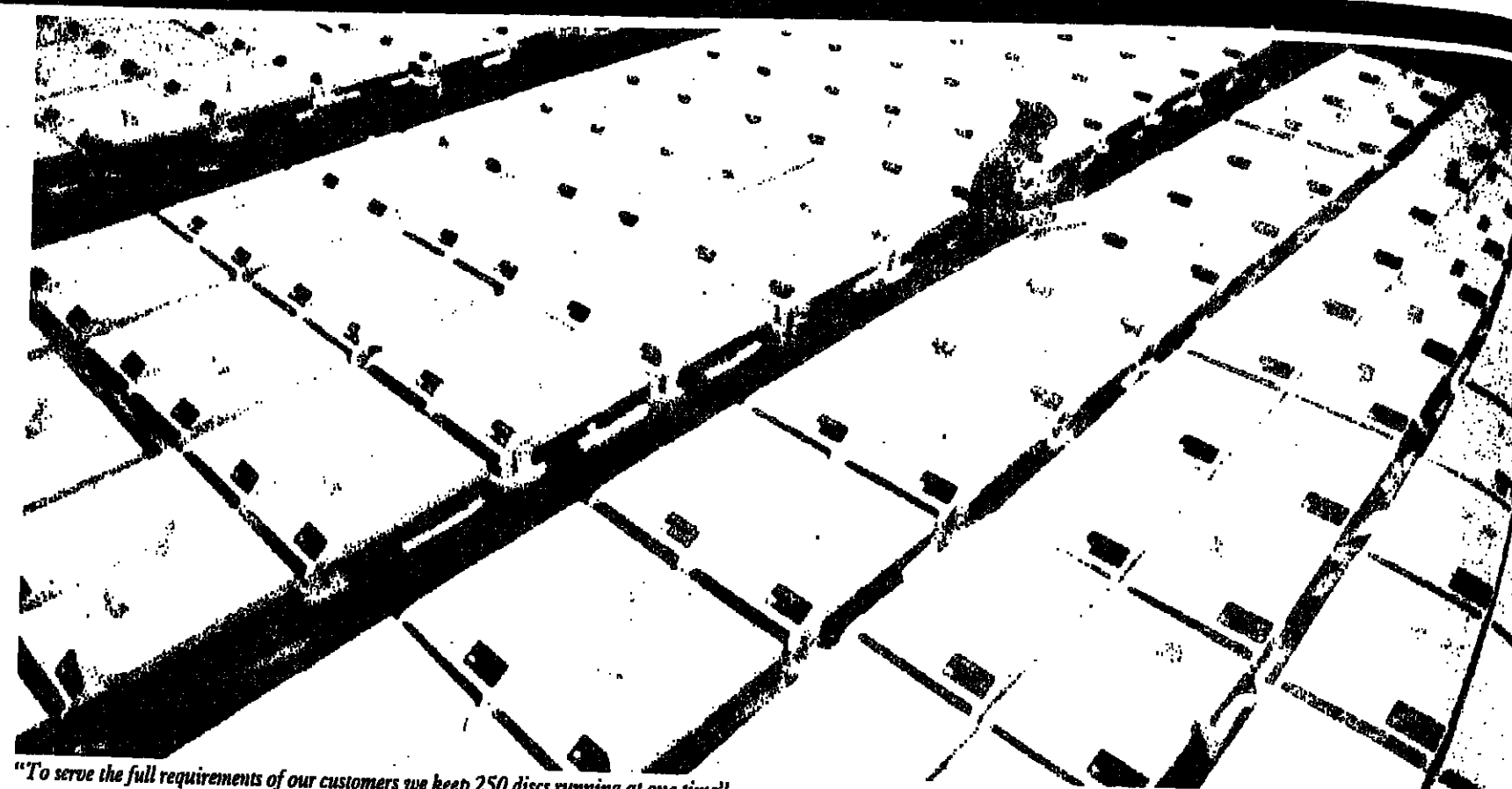
Address _____

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PERKIN-ELMER



If you have £10m a year to spend on computer hardware, how do you choose your vendor? Kevin Cahill went to Germany to see how the world's largest independent commercial DP bureau, Datev, implements a unique dual vendor policy



"To serve the full requirements of our customers we keep 250 discs running at one time".

Dual vendor policy at the world's biggest independent bureau a threat to IBM?

THE problem with Datev is that it encourages too many superlatives. It is one of the biggest, maybe the biggest, independent data processing bureau in the world. The company, organised as a co-operative, has a turnover of over £30 million, a membership of 20,000, and a main database containing the current accounts of 800,000 companies.

Based in the southern German city of Nuremberg, Datev, from its massive data centre in Albert Dürer's birthplace, serves a user population of 25,000 terminals, via 21 communications concentrators scattered throughout the rest of the country.

The bureau is 15 years old and has done most of its growing at an average rate of 20% a year at a time when most big and some not so big bureaux are going out of business. So what's special about Datev? Heinz Seiberger, the chairman, chief executive and founder, explains as he gazes across a "desert of discs" in the data centre.

"Datev is specialised. It serves only one end user, its tax consultant owners, and via the consultants the 800,000 companies who are its owners' clients."

Seiberger pointed to the row upon row of discs. "To serve the full requirements of our customers we keep 250 discs running at one time. The main database of live current accounts is located on just 60 discs, but there is also our Lexinform database, holding all the relevant laws affecting tax and accounting, plus a series of commen-

taries from the main legal journals. This amounts to about 53,000 pages of documentation."

The massive array of disc units is a mixed collection of Siemens-Fujitsu and IBM drives, principally 3310, 3320 and 3330 units.

The first two IBM 3380 disc drives are being readied for use in the background, but Seiberger is thoughtful when he refers to the 15 months he had to wait to get them. "We had to go to Siemens/Fujitsu for a whole lot of their 3842 and 3846 units while we were waiting."

He was not precise about what the delays might have cost IBM, but the impression is that more than half the order went East in the interim.

Seiberger says he is an IBM customer in the full sense, which is easy to see in the CPU centre which itself contains two 3033s and a series of other IBM machines

including a 3081D which has only been there for six months and is now being replaced by a 3081K, 40% more powerful than the D.

"We are not a PCM site. What we have, is a dual vendor policy. All our software, including the main databases, are written in IBM software, so we have to be IBM compatible."

But here Seiberger makes a point seldom fully articulated in the industry: "You are not truly independent of IBM until you have a supplier who can provide you with a complete set of systems software."

Which brings him to the other processors in the data centre. Decked out in the Siemens colours, and with Siemens numbers, the two principal processors are nonetheless a Fujitsu M180 and a Fujitsu M200. Until recently these were the top end of

the Fujitsu range, but Seiberger has more ambitious plans.

He is due to visit Fujitsu in Japan within weeks and implies that while there he will be indicating that he intends to become the first European commercial customer for the 22 mips M380. This is the machine ICL now sells as the Atlas 10.

Seiberger already has the Fujitsu operating system in use in his data centre on one of his machines, the M200.

Datev technical director Peter Tennert explains that they had problems initially, but only because the main database is a version of Stairs, built around T CAM.

The Fujitsu operating system, called in its Siemens disguise BS5000, only supports VTAM.

Tennert also noted that the highest volume of unscheduled initial program loads was in MVS, on IBM's own machines.

"With MVS loaded on a Fujitsu machine there was a fall in unscheduled initial program loads, but the lowest number of unscheduled initial program loads was on the Fujitsu machine running its own operating system."

Datev's entire system, while based on IBM systems software, has been heavily amended by the company's own programmers.

According to Seiberger any machine in the centre must have uninterrupted access to the entire data pool - which explains why a Datev has 260 programmers on the staff.

But the main programming problem, and Seiberger's ultimate guarantee against the micro making his huge organisation redundant, are application program changes.

Last year the data centre director instituted 2,450 application program changes, mostly as a result of changes in legislation.

At one point last year Datev had less than a month to make a series of major payroll tax changes which affected payroll run by more than half the company's membership.

Seiberger suggested that a small company with a standalone micro installation could not hope to cope with the conversion costs whereas Datev could do the job for all 800,000, in one go at lower cost.

The main hardware budget is over £10 million a year.

Datev's entire operation is split into five units, each independently treated under the dual vendor policy and in terms of management control.

The principal units are the terminal network, with 10,000 online terminals and 15,000 batch terminals.

Between the terminals and the data centre with its collection of

"You are not truly independent of IBM until you have a supplier who can provide you with a complete set of systems software"

CPUs is the communications network, with the 21 concentrators scattered around Germany. These have brought over 40% of the user base on to a local call charge for all their work.

The database storage system, in effect the disc units, are treated as a separate unit, and finally there is the output unit.

Most installations would not have bothered to constitute their printers as a separate part of the system, but Datev has, so far, 19 laser printers, seven from IBM, 11 from Siemens and one from Xerox.

The output, which also seems to account for the bulk of Datev's workforce of 1,600 is 30 tons of paper a day.

This is despatched, in separate packages, to about 16,000 addressees each day, mostly in the form of profit and loss accounts and balance sheets.

Datev also has a room full of microfiche printers which produce over 1,000,000 fiche pages a month.

But the Datev organisation, technically huge and impressive as it is, could easily conceal the real importance of the company in Germany. Datev now represents most of the data processing activities of

most of German's accountants and tax advisers.

A lot of the work is simple accounting for the smaller client and the accountants, many of whom could not afford their own computer.

But much of it is specialised accounting, often for companies which do have a computer. Periodically, Tennert and his staff prepare a new terminal specification, which they circulate to interested vendors.

In theory potential sales of 25,000 are the lure, although Seiberger insists that he will never give a manufacturer any form of initial contract or minimal volume guarantee.

In practice the Datev specification has begun to assume the form of a terminal standard with sales potential well beyond the company's own immediate users.

Currently Triumph Adler, alongside Olivetti and Kienzle, are the key suppliers of terminals to the Datev membership, and beyond it to the many clients of the membership.

This pace-setting influence is the terminal marketplace has led with Datev for some time, but it is now beginning to have a leadership influence in communications and mainframe use too.

According to a number of German magazines, Seiberger is the second most important man in the German computer industry, after Heinz Nixdorf.

And as a user of vast experience, with his network of data communications connecting the most influential professionals in the commercial world to each other and to their clients, Seiberger has enormous muscle.

He does not complain about IBM; neither does he criticise the company, but he does make clear the endless problems he has had to solve because of the size and inflexibility of his principal supplier.

Despite his even-handed approach to IBM, his predilection for a vendor whose designers he can talk to and which will consider his suggestions at the design phase, are obvious. And on that basis he is undeclared but preferred vendor to Fujitsu. So much so that a combination of his dealings with that company and the first papers from the fifth generation project have led Seiberger to consider sending four or five of his staff to Japan for a series of three-year tours.

Datev is one of three bureaux which have a somewhat similar structure. One is based in Paris, the other, TKC, in Tokyo. On his trip to Japan Seiberger is hoping to organise a permanent satellite link between TKC and Datev.

Obviously, the contents of the databases will not be interchangeable, but Seiberger hopes to develop development tools and expertise with his Japanese partners, thereby tightening the links between a European user of indigenous software, and the growing strength of Japanese technology.

STATE OF THE MARKET

John Aczed reports on the marked decrease in value of foreign sales

British exporters face tough competition as prices are cut

BRITISH exports of computer products have been affected by price cutting and tough competition has been reported in some markets. Sales volumes abroad have been well maintained, but considerably lower prices have been charged for some products in recent months.

According to the latest trade figures, which refer to February 1982, exports of peripheral equipment amounted to 27,400 units, and this represented a rise of 2.6% compared to the previous month. In value terms, however, there has been a drop in sales, with deliveries abroad amounting to only £28.3 million in February as against £30.3 million in the previous month.

Evidently, the cost per product has dropped markedly in this period. In January the average price was over £1,100 and this fell to about £1,000 in the following month. The drop was particularly

significant, as British exports already benefited from a fall in the value of the pound against other currencies.

The most significant decline in sales has been recorded in Western Europe, particularly in West Germany. Deliveries to Germany amounted to only £4.3 million, representing a drop of 30% compared to the previous month. Exports to Italy were also down and showed an average drop of 10% in this period.

In contrast, British exports have recorded some gains in North America, especially in the US. They advanced by 12% to nearly £1.2 million, although this figure was still below that seen at the end of 1981.

In terms of product groups the trend was mixed, but higher exports were reported for disc storage units as well as for other types of storage facilities. Sales of printers edged up and showed a rise of

8% by value, but deliveries of VDUs were considerably lower; they dropped by 28%, while in volume terms, only 9,700 were exported during February.

Imports of some computer products were higher during February, and for the peripheral sector as a whole they amounted to £46.9 million, a rise of 7.5% compared to January. By volume, imports remained steady and amounted to 55,400 units.

The figures reveal that the US has increased its market penetration of the British market and its sales reached a peak of £28.5 million. They accounted for 60% of total imports for peripheral products, but other suppliers have also made further inroads into the British market. In particular, West German manufacturers have increased their sales to the UK and reported deliveries of £4.5 million.

Imports from Japan have been fluctuating, but they recorded a

useful increase in February compared to the previous month. They amounted to £1.5 million in this period, but were still lower than at the end of 1981.

A marked increase in imports of VDUs has been reported, with the total reaching £6.7 million in February at an average price of about £600 per unit. Imports of storage units remained relatively steady, amounting to nearly £12 million in February as against £12 million in the previous month, while printers used in the computer sector moved up marginally to £8 million.

Undoubtedly, British exports should increase in the coming months and will benefit from the relatively low level of sterling against other currencies. Further growth in volume terms will be seen, but whether this will be reflected by value is debatable, because of the significant price cutting which is now evident in many markets.

	February 1982	January 1982	September 1981
	No.	No.	No.
Peripheral units			
Disc storage units	1,516	1,758	7,053
Magnetic tape storage units	225	375	1,804
Other storage units	112	212	447
Printers	2,666	3,422	7,689
Readers and punches	134	91	873
Visual display units	9,729	12,580	54,197
Other terminals and consoles	326	309	1,811
Other peripheral units	12,679	7,071	36,681
Offline data processing equipment			
Punches, verifiers and calculators	53	9	326
Other equipment	558	258	5,433

British exports of computer equipment by product groups (by volume).

	February 1982	January 1982	September 1981
	£000	£000	£000
Belgium-Luxembourg	693	332	3,287
Canada	340	490	2,290
Denmark	421	403	1,199
France	2,727	2,084	9,071
Germany (West)	4,480	3,942	13,396
Ireland	1,051	778	4,614
Italy	1,900	3,303	16,030
Japan	1,563	1,082	6,862
Netherlands	1,855	2,455	6,660
Spain	312	568	7,059
Sweden	915	919	5,763
US	28,496	25,922	112,099

British imports of peripheral equipment (by main suppliers)

	February 1982	January 1982	September 1981
	£000	£000	£000
Peripheral units			
Disc storage units	10,083	9,331	39,729
Magnetic tape storage units	2,090	1,464	12,379
Other storage units	562	1,352	2,668
Printers	8,044	7,666	39,174
Readers and punches	487	230	1,186
Visual display units	6,669	4,885	21,555
Other terminals and consoles	2,355	2,600	11,867
Other peripheral units	16,694	16,059	72,220
Offline data processing equipment			
Punches, verifiers and calculators	88	46	317
Other equipment	802	1,038	4,586

British imports of computer equipment by product groups (by value).

	February 1982	January 1982	September 1981
	No.	No.	No.
Peripheral units			
Disc storage units	11,765	9,375	38,017
Magnetic tape storage units	1,612	1,402	11,925
Other storage units	400	714	3,280
Printers	11,691	12,745	57,638
Readers and punches	12,221	878	1,871
Visual display units	10,845	8,857	33,391
Other terminals and consoles	2,003	3,147	13,465
Other peripheral units	16,704	19,087	83,367
Offline data processing equipment			
Punches, verifiers and calculators	236	48	841
Other equipment	2,308	3,088	8,087

British imports of computer equipment by product groups (by volume).

	February 1982	January 1982	September 1981
	£000	£000	£000
Belgium-Luxembourg	1,449	889	5,596
France	5,287	5,337	24,694
Germany (West)	4,300	6,167	30,387
Italy	3,044	3,346	15,681
Netherlands	1,072	976	6,285
Norway	383	775	1,392
Saudi Arabia	1,367	2,144	3,562
South Africa	1,629	1,089	5,178
Spain	846	864	4,786
Switzerland	983	1,493	6,118
Sweden	1,253	1,382	6,272
US	1,157	1,028	7,001

British exports of peripheral equipment (by main markets).

	February 1982	January 1982	September 1981
	£000	£000	£000
Peripheral units			
Disc storage units	3,692	3,546	17,123
Magnetic tape storage units	277	294	3,446
Other storage units	203	369	1,331
Printers	2,530	2,342	11,581
Readers and punches	755	381	4,036
Visual display units	9,982	13,817	56,752
Other terminals and consoles	571	1,198	4,355
Other peripheral units	10,273	8,395	42,344
Offline data processing equipment			
Punches, verifiers and calculators	20	20	57
Other equipment	363	285	1,985

British exports of computer equipment by product groups (by value).

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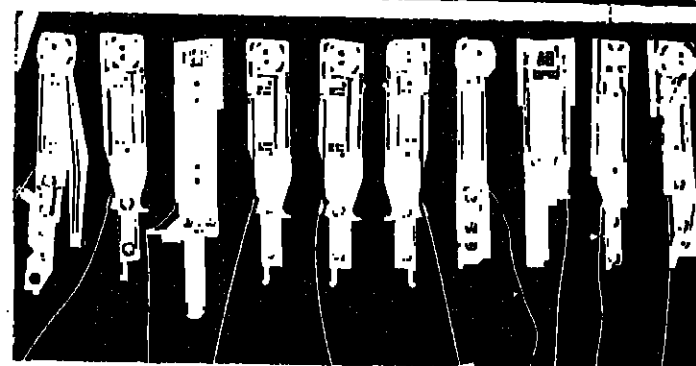
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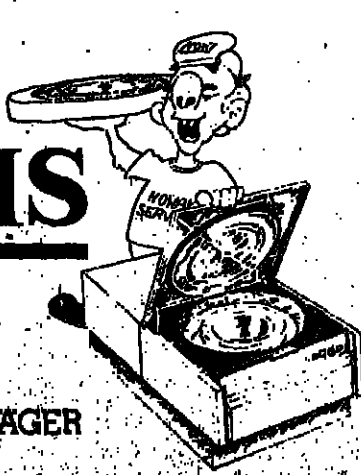
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Is inadequate back-up giving you a false sense of security?

by John Kavanagh

THERE is something about computer cables that mice find irresistibly tasty. They revel in the wide open spaces beneath the computer room's false floor, nibbling at the cable coverings until one gorges its way right through to the wire.

The result is a little furry rodent with its legs in the air — and a string of disc drives or a complete computer system dying suddenly in mysterious circumstances.

This scene is painted by Stephen Hitchcock, marketing manager at Unilever Computer Services (UCSL), to show that although data processing managers might

think they are safe with their standby generators and fire extinguishing equipment there are 101 unexpected little things that can bring a complete installation to a standstill.

Losing the computer can almost be as frighteningly final as having a life support system switched off, says Hitchcock. A US survey shows that if a financial institution such as a bank loses its data centre it can continue to run its essential functions for just two days.

In other words, if the computer centre is burnt down on Monday the company could be out of business by Wednesday. Banks are special cases — but the survey also shows that the average for all industries is less than one week.

Although there is greater awareness of the need for standby facilities, too many installations are in danger of being caught out by "totally inadequate" arrangements, says Hitchcock.

The most common arrangement is the frozen standby. This is

where two companies near to each other and with similar configurations enter a mutual aid agreement.

Hitchcock dismisses such arrangements completely: "This is useless because anyone with a well-organised installation is going to be using expensive capital equipment to the full. It just won't have spare capacity to help out its neighbour. Is it really going to take on half or even a quarter of its partner's work for weeks on end if there is a disaster?"

"This is a totally superficial solution. All it provides is a false sense of security."

Another arrangement, the cold standby, involves portable or static air-conditioned computer rooms without computers. Some organisations have their own, others have contracts with companies offering static computer rooms complete with standby generators, modems and furniture or portable rooms, erected within a week.

The advantage here is low cost: an "insurance premium" of up to £7,000 a year.

But Hitchcock points to a disadvantage: "Equipment manufacturers usually bend over backwards to provide replacement machines but it still generally takes between two and six weeks. By that time you can be out of business."

A warm standby arrangement is like a conventional time sharing bureau service. When disaster strikes the user can get on the machine quickly but only gets a share in a remote machine run by another company, without total control over the workload or security. The equipment configuration is unlikely to match user requirements exactly.

"This is fine for running one or two standalone applications, for coping with workload peaks and for conversion in readiness for a new machine. But it isn't a solution to a disaster," says Hitchcock.

Some companies have gone the whole hog and installed exact copies of their production mainframes and peripherals as standby machines. "This is great — but to keep costs down they put the two machines in the same building, usually in the same computer room," says Hitchcock. "We call this 'burnt standby' because if the main computer goes up in smoke so does the back-up machine."

Bureaux like UCSL claim to offer a "pleasantly hot" service. UCSL's is an immediate standby service to IBM users in the form of fully equipped computer centres, complete with large, "empty" mainframes.

Members of the UCSL Back-up Club which are hit by disaster mount their own operating systems and applications software, configure the equipment as they wish and run the installation themselves. The arrangement is part of UCSL's standard bureau service.

Hitchcock further claims UCSL's service is unique as the company constantly upgrades its machine configurations in line with changes made by the Back-up Club members at their own installations.

In addition, UCSL was one of the first customers of British Telecom's new Overlay digital transmission service, which guarantees very fast connection of high-speed data and voice communications.

With a hot service the customer's staff can go to the standby site as soon as a disaster strikes and simply take it over. Live systems can be running as soon as the operating system and programs. The centres normally include furnished offices with telephones, communications equipment and in some cases local display terminals and printers.

UCSL encourages customers to take the disaster business very

seriously. They must have specific procedures covering everything from the periods at which files are copied to the naming of the person responsible for telephoning for the standby service if it is needed.

UCSL's service has been set up in response to a new attitude towards back-up, sparked off by the extension of computing to all parts of many companies, according to Hitchcock.

"Three-quarters of the installations we talk to are now actively concerned about standby because they see that more and more departments are coming to rely on computing in their day-to-day operations," he says.

"The ultimate is where the chairman gets his own colour graphics terminal. This is something of a body blow to the community of data processing managers because every time the hardware hiccups the chairman knows."

However, the hazards have not changed much over the years. They range from hardware and air conditioning failure to floods, terrorist sabotage and aviation disasters. In between there are vandalism by staff or outsiders, structural damage to the building, perhaps caused by renovation or vibration from a busy road nearby, a fire caused by carelessness in the stationery store or operators' room, or industrial action by one

Every 30 minutes a crucial computer bursts into flames... or grinds to a standstill

puter staff or suppliers.

"The board of directors now tended to regard machine room collapse as coming from a Hollywood-type epic disaster, with a probability equally remote," says Hitchcock. "But computers are immensely sensitive creatures and it is the silly little things that cripple them: a leaky roof, a broken fan belt on the standby generator, a leak in the IBM mainframe cooling system — or a hungry mouse."

"Every quarter we spend two days on a full test-drill at each Back-up Club member. And if they get a new version of the operating system or tinker with it themselves they are obliged to come and test it on our equipment. We've been in the bureau business for 13 years and we know just how much the business depends on top-flight contingency procedures."

Hot services cost around £20,000 a year. "One of the big building societies has said that its computer centre was burnt down it would lose customers from day one," says Hitchcock. "And those customers would be lost for ever."

"Any big company will lose millions of pounds a day. With back-up they will probably be able to get substantial cuts in their premium payments to their insurance companies."

UCSL is increasing the number of standby computer centres in line with the risk. But Hitchcock is still trying to convince large, experienced installations which believe remain self-satisfied, their standby arrangements, to take on the service.

"Every 30 minutes somewhere in the UK a crucial computer bursts into flames, leaks boiler, grinds flood water or grinds to a grinding standstill," he claims. "While IBM, ICL and the others strive to give more bang per buck it's all rather pointless when the fuse blows and suddenly the computer staves you in the face."

"And it's no good just putting down a few mousetraps."

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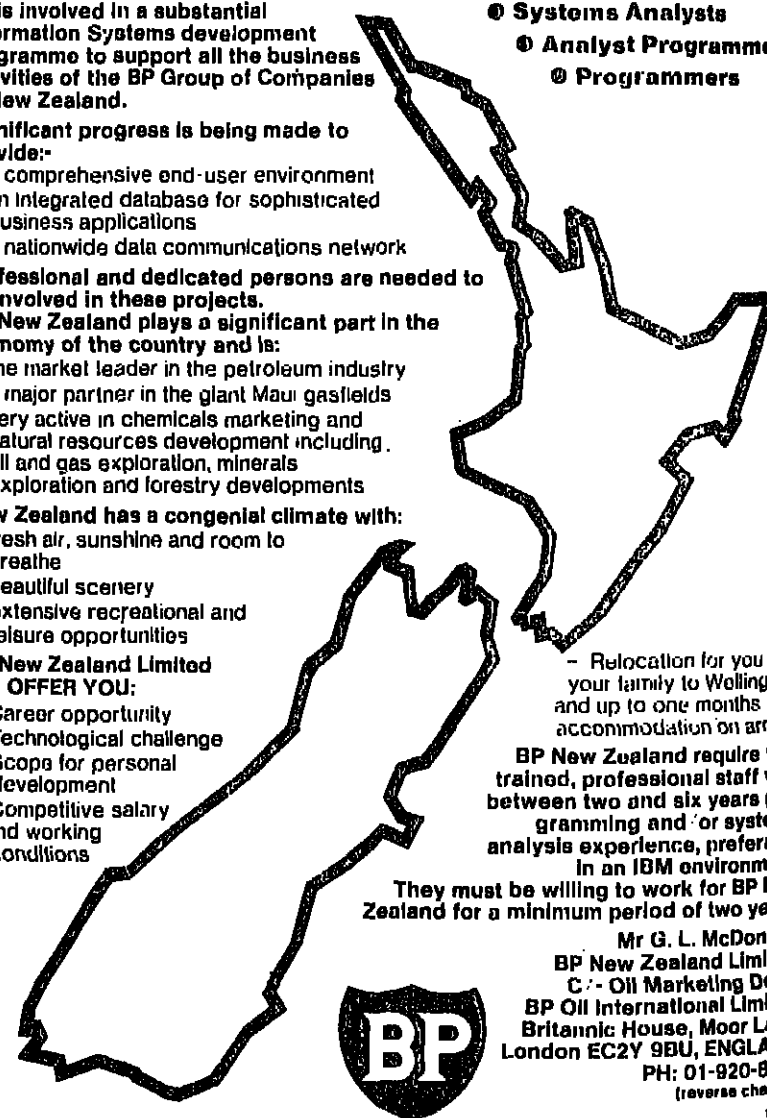
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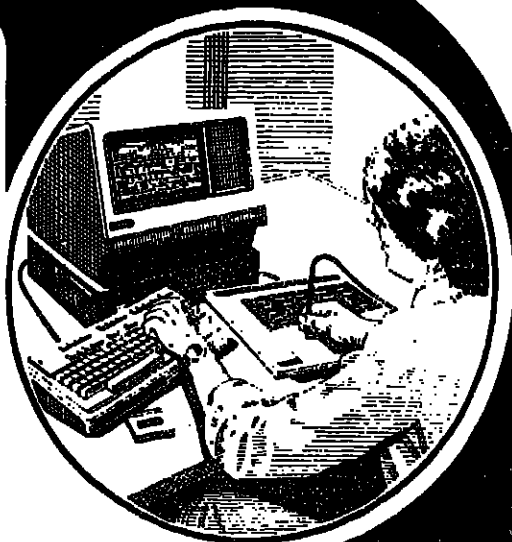
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TRAINING CONSULTANTS - PROGRAMMING

Required Skills: Minimum 2 years experience in a large IBM mainframe environment plus at least one year teaching/training experience. Knowledge of MVS JCL TSO/SPF and Utilities, together with PL1 Cobol and Fortran. Must be able to work with students for whom English is a second language.

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Required Skills: At least 2 years System Documentation. Writing experience plus one or more years Programmer/Analyst experience.

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Required Skills: MVS JCL Writers for Conversion and Automated Scheduling project. Systems programming background desirable.

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Required Skills: MVS JCL TSO/SPF VSAM. Knowledge of Minicomputers and experience in Engineering, Graphics or Operations Research.

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Required Skills: At least 3 years Systems Programming with experience in ACF 2 or Computer Security Systems. The work will involve the evaluation, co-ordination and development of Security Systems for Distributed Computer environment using ACF 2. Experience of user training would be useful.

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IBM PL/1 IMS COBOL TSO/SRP
IBM PL/1 IMS DB/DC JCL TSO/SRP

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1. Support Engineer - Ref: MR1076

To work as part of a team maintaining a telephone exchange simulation system. 3 years plus knowledge of digital equipment is essential and analogue experience would be useful. Possibility to move ultimately into design applications exists.

2. Design Engineer - Ref: MR1077

To work as part of a team developing a local area network system. The successful candidate will have particular responsibility for the development of device interfaces, e.g. terminals and controllers. Ideally a minimum of 3 years' experience in microprocessor applications, preferably with some software knowledge, should be held and also, candidate should be willing to become involved in writing software using both high and low level languages. Software training will be provided where required.

3. Senior Technical Author/Supervisor - Ref: MR1067

To be responsible for a team of three writing User Design manuals for telecommunications applications. The successful applicant will have several years' background in either software or electronics together with sound writing and supervisory experience. He should also have the aptitude to promote technical publication services within the company.

4. Software Engineers - Ref: MR1079

To work on a variety of new projects with a rapidly expanding minicomputer manufacturer. Applicants should have a minimum of 3 years' experience, together with an enthusiastic and committed approach to software development.

5. Technical Authors - Ref: MR1054/5

To write User Manuals for the above client (at 4) and as part of a small select team. Junior positions require a minimum of 2 years' writing experience, preferably within a software environment. However, consideration will be given to programmers with a flair for writing. Senior positions require a minimum of 4 years' experience. Successful applicants will be expected to work largely on own initiative although, of course, whilst liaising with other team members and to trial staff.

6. Training Officers/Instructors - Ref: MR1075

Here our client, an independent training organisation, requires instructors for both their Manchester and London centres. Applicants need not be already involved in training but, must have experience in one of two areas:

- Circa 5 years in Systems/Business analysis - covering commercial DP, including Systems Investigation, Analysis and Design.
 - Circa 3 years pure programming of, with some analysis content - covering commercial programming, mainly COBOL, in an IBM or similar byte-oriented environment.
- These positions require applicants to be well presented and mature in outlook and should appeal to those who enjoy the communication and problem-solving aspects of training.

7. Electronic Engineers - Ref: MR1078

To work on a variety of Marine projects. Applicant should have a minimum of 2 years' experience of product design and be prepared to work as part of a team. Opportunities for further training exist.

Outlined above is a selection of requirements in UK at time of going to Press. New ones constantly arise so, if you have expertise to offer in absolutely ANY field connected with Data Processing and/or Electronics please submit your career resume to the address below - as we may well then already have the career opportunity you seek, in UK or Overseas.

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Applications are invited from experienced systems analysts for this post in the Computer Section of the Executive's Office. The successful applicant must be qualified in either British Computer Society or Management Services Institute.

The installation consists of both an ICL 2900 and ME29 computers using DME, TME, and PMS. The successful applicant will be mainly responsible for development of office information systems using word processors, ICL 7602 equipment and microprocessor. Experience of office procedures and business procedures will be welcomed.

Application forms from the Director of Management Services, Municipal Buildings, Knowsley L32 1TX, Tel: 061-545 8955 (Ext. 222) or 061-545 8956 (Ext. 223) should be returned not later than 17th September 1982.

ANALYSTS AND PROGRAMMERS

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BUPA run a number of applications utilising minis and large IBM and IBM compatible mainframes. A range of software is employed, including OS/VSE, VM, CMS, CICS, Adabas, Librarian and VSAM. Programming languages used include PLI, COBOL, Assembler and Natural.

The range of applications being supported, under development and at feasibility stage, will be outlined in the BUPA Company Profile which will be sent to responding applicants.

Vacancies currently exist for ANALYSTS and PROGRAMMERS, at various levels of seniority, to join one of a number of project teams.

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The benefits package provided by BUPA is excellent, and includes mortgage subsidy, season ticket loans, subsidised restaurant and of course... free BUPA!

Full details on BUPA and on the positions themselves have been prepared, and will be sent, with an application form, to all responding applicants. To receive these details please either telephone the number below or return the coupon. Initial interviews can be conducted up to 8.00pm Monday to Friday, or on Saturday mornings, by appointment.

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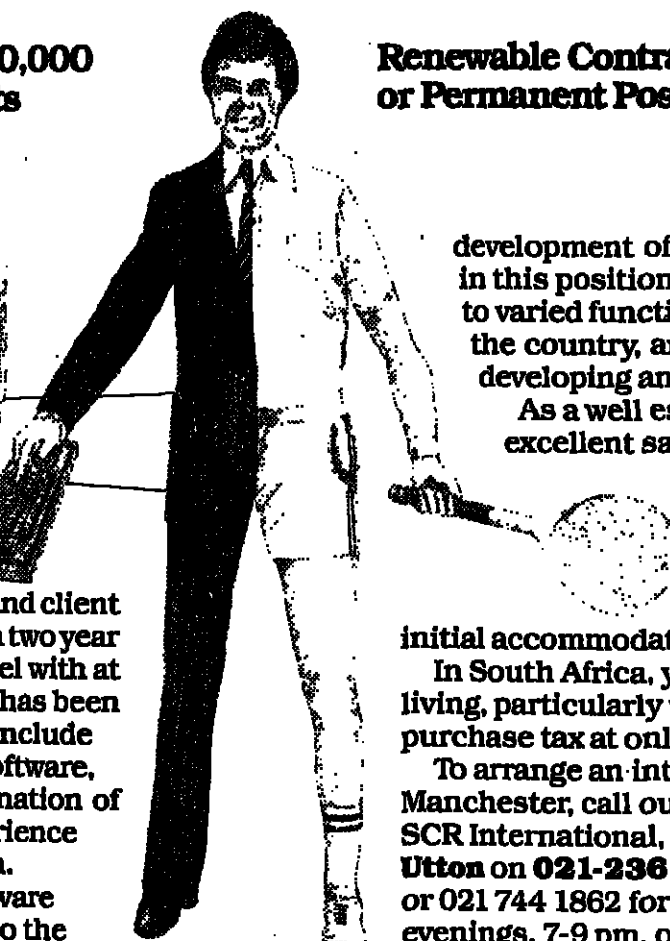
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To assist in these developments the company wish to recruit a communications specialist who has experience of a large IBM mainframe environment, ideally with exposure to VTAM and MCP. Additionally, knowledge of some of the following facilities would be beneficial: x 21, x 25, packet switching, data scope and data stream.

You will be involved in the installation of a national communications network and local area networks using a range of micro computers, whilst a very

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For further details of this excellent position please contact Peter Brown on 061-491 1666 (during office hours) or 061-724 8376 (evenings/weekends) or write to him at Computer People North, Sovereign House, Stockport Road, Cheshire, Cheshire SK5 2EA.

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CONTACT: **DAVID WADE**, Director, as advisor to the Client Company on this appointment.
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You are a competent systems programmer, ideally with in depth experience of DEC VAX. You will provide technical support for the set-up and tuning of a new central computer. Additionally you will undertake one of the client's Senior Analysts, to progressively assist in:
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PASCAL PROGRAMMERS
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CIS COBOL
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DATA GENERAL/BUSINESS BASIC
Hardware Engineers
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SMI CMC REALITY packages
SYSTEM X EXPERTISE

Contact: STEVE WHITING, STEVE CASEY
DEREK WADHAM, DAVE PEART
DAVE LONKHURST, KEITH TAYLOR
PETER HOLLIDAY, MARK ATKINSON
or SANDRA CAREY

OVERSEAS 0252 516141 SAUDI ARABIA

Contact: BILL EVANS
6 months-plus assignments commencing
August/September
ANALYST OFFICE AUTOMATION:
Word processing experience, e.g. IBM, WANG or
various personal computers

ANALYST—SMALL BUSINESS COMPUTERS:
Business application experience plus knowledge of
software tools for microcomputers—Apple, Tandy,
TRS-80, HP125, etc.

SENIOR ANALYST—ADVANCED OFFICE SYSTEMS:
Planning, co-ordinating and directing installation of
equipment to user application areas, i.e. graphics, word
processing, telex automation, data and text
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GERMANY

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OPERATORS 0252 516141

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BURROUGHS 67/68/6900 MCP OPS
VAX OPS
DATA ENTRY OPS
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MIDLANDS & NORTH 021-742 4431

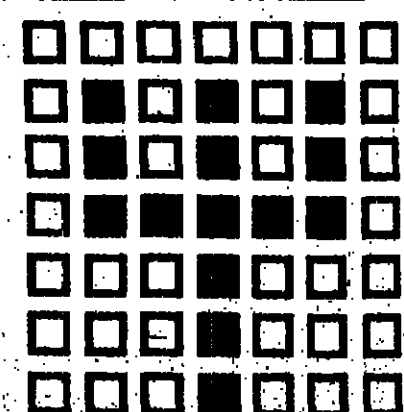
ICL VMEB COBOL IDMS or TPMS
IBM, PL1, all levels
IBM CICS OL1 COBOL
IBM COBOL with IMS
IBM SYSTEM 34 RPGII A/P—Merseyside
UNIVAC 1100
UNIVAC 1100 DMS, TIP, Systems Programmer
IDMS DATABASE Administrator
Analyst—Various Systems
PDP RSX11M BASIC + or BASIC + 2
PDP RSTS/E BASIC +
FORTRAN PROGRAMMERS
OS MVS CICS JCL WRITER
ICL VMEB COBOL IDMS or TPMS
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Contact: NEIL SMITH or KAREN LONGCROFT

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A major communications company requires specialists for the development of communications systems. Interested candidates should have experience within the following areas: Package Switches, Private Networks, X25, Local Area Networks, Military Projects, Operating Systems, Languages/Compilers and Device Drivers. Ref. CW 26/1

ESSEX SOFTWARE ENGINEERS

Our client is involved in the design of fully integrated engineering and Software Systems in their Defence and Communications Industry. They require immediate Software Programmer with a minimum of 2 years' experience including Assembler in a Mini/Micro environment. The company offers excellent career development within Real Time Systems together with a generous relocation package if required. Ref. CW 26/2

SCIENTIFIC PROGRAMMERS LONDON

An expanding division of a well-known Software House have immediate openings for the following projects: Real Time Simulation, Process Control, CAD, Command + Control and Mathematical Modelling. Successful candidates should have one or more of the following: Minimum 2 years' Software Programming, PDP11, RSX11M, VAX 780, ASSEMBLER, CORAL 66, RTL2 and FORTRAN. Ref. CW26/3

SWITZERLAND GERMAN-SPEAKING SOFTWARE ENGINEERS

A major communications company require additional German-speaking programmers, to develop new communications Software. Candidates should have a minimum of 2 years' Real Time experience in this field. Ref. CW10/4

HARDWARE ENGINEER BEDFORDSHIRE

Satellite communications is our client's speciality. They currently wish to employ a Hardware Engineer with a minimum of 3 years' experience in industry. A degree background is necessary plus some involvement in Software Hardware experience of TTL and ECL design on micro would be ideal. Ref. CW26/5

ASHFORD SOFTWARE ENGINEERS

A company dedicated to Communications Systems is currently seeking engineers with a variety of the following:

- IBM/ICL PROTOCOLS
- DEC/RSX11/VAX
- CORAL
- NETWORKS
- EMULATORS
- X25
- DEFENCE
- INTEL 8086
- PROCESS CONTROL

Ref. CW26/6

SYSTEMS ENGINEERS IN EUROPE - HOLLAND

One of the UK's largest Systems Consultancy and Implementation organisations offers an exceptional combination of involvement, experience and commitment in a number of specialised application areas.

They are looking for System Engineers to undertake an initial assignment in Europe working at the design stage of a Real Time project.

Candidates should have:

- A minimum of 6 years' experience
- Specialised knowledge of Fire Control Systems
- Guidance Systems
- Radar/Sonar
- Navigation or EW Systems

Ref. CW26/7

SYSTEMS CONSULTANTS LONDON

Our client, a leader of International Business Communications requires additional Systems Consultants to work from their London base with occasional overseas travel possible.

Systems Consultants will be involved in System Design for a variety of industries using new technology involving video communications on Real Time Systems.

Candidates should have experience of DEC, VMS or RSX11 ability to design Software for a wide range of terminals and networks. Ref. CW26/8

SOFTWARE ENGINEERS MIDDLESEX

Our client applies traditional engineering disciplines to Software Design and Production. Their applications include Weapons Guidance, Satellite Communications, Mathematical Modelling and Systems Simulation.

Candidates with compatible experience to the above applications will gain a remarkable breadth and depth of knowledge, not just on a theoretical basis but through practical experience, and close involvement in some of the most advanced Real Time Systems anywhere. Ref. CW26/9

COMMAND & CONTROL LONDON

One of the largest international Software houses with their headquarters in London have a requirement for Software Designers with a minimum of 1 year's experience in Real Time Systems Design, candidates should have a degree plus experience in one or more of the following:

- Defence Systems
- Mascot
- PDP 11
- CORAL
- VAX
- INTEL 8086

Ref. CW26/10

All the above appointments involve permanent positions and carry a wide range of salary and conditions dependent on location and experience. In the first instance please send us a copy of your CV (alternatively telephone for an application form) so we may discuss your application in confidence with our client on your behalf.

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(0711)

EXCELLENT CONTRACTING OPPORTUNITIES

Our immediate domestic and international consulting needs are detailed below. If you are of a professional disposition, skilled and dedicated, and wish to join our permanent or contract staff, please contact us in respect of these and future opportunities.

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COBOL, OS, TSO/SPF
COBOL, IMS/DB
COBOL, IBM 4341,
DOS/VSE

WANG
International Banking
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RPG II S/34 and/or
RPG III, S/38

UK
COBOL, CICS, DL/1

COBOL, IMS DB/DC

COBOL, ICL 2900, VME/B,
IDMS DMS or TPMS a
bonus Datapoint

COBOL, TSO/SPF
MARK IV
COBOL, ASSEMBLER
IBM 4300, DOS/VSE
DE/RPG, IBM S/280

RPG III S/38 and/or
MAAPICS

Programmer/Analyst
Programmer/Analyst
Senior Analyst
Analyst/Programmer
Analyst,
Programmer/
Analyst/
Programmers
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Technical Designer,
Project Leader,
Programmers
Senior Programmer
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Late applications will be accepted at: TRINIDAD AND TOBAGO TELEPHONE CO. LTD. (ATT. J E KASSIE), PO Box 917, 85 Abercromby Street, Port of Spain, TRINIDAD.

(0890)

IBM Computer Operators

Fluor (Great Britain) Limited is part of one of the world's most successful companies in the engineering and construction industry, with particular emphasis in the energy field.
Our European Data Centre is currently based on an IBM 4341 - 2 using MVS/JES-2, TSO, VSPC, IMS and NJE software. The associated network has RJE and interactive terminal links to our offices on the Continent and in the U.S.A.

The planned expansion of the Company's network requires the introduction of a 3 shift system. We, therefore, have vacancies for the following positions:

Senior Computer Operator

Candidates should be in their mid to late 20's with 3-4 years experience working in an IBM MVS/JES-2 environment, preferably in a supervisory role.

Computer Operator

Candidates should have at least 18 months operating experience of the above system.

Salaries will be negotiable according to age and experience, plus relevant shift allowance.

If you would enjoy the challenge and scope available within our Company, please send your c.v. with day time telephone number to the Personnel Officer, Fluor (Great Britain) Limited, Fluor House, Euston Square, P.O. Box 309, London, NW1 2DJ. Alternatively, telephone 01-388 4222 ext 4206, for an application form.

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Our client, a leading manufacturer of micro-business systems, is looking for dynamic commercial systems specialist who can demonstrate a flair for commercial and development of data processing in business and administrative areas. Wide experience in use of business mini and micro computers is essential. The candidate will co-ordinate, develop and manage the service, research and educational aspects of micro-business systems throughout the Manchester Central District. Salary range p.a.: £12,000-£16,000.

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Further particulars including method of application are available from the Association of Commonwealth Universities (Apost), 39 Gordon Square, London WC1H 0PF, or from the Registrar of the University, P.O. Box 66, Dunedin, New Zealand. Applications should be submitted as soon as possible.

(0901)

THE UNIVERSITY OF MANCHESTER

SENIOR LECTURER IN COMPUTATIONAL METHODS IN MEDICAL SCIENCE

Applications are invited for this post, available initially for 3 years from candidates with teaching experience in universities or polytechnics and with a strong background of data processing in business and administrative areas. Wide experience in use of business mini and micro computers is essential. The appointee will co-ordinate, develop and manage the service, research and educational aspects of micro-business systems throughout the Manchester Central District. Salary range p.a.: £12,000-£16,000.

Further particulars including method of application are available from the Association of Commonwealth Universities (Apost), 39 Gordon Square, London WC1H 0PF, or from the Registrar of the University, P.O. Box 66, Dunedin, New Zealand. Applications should be submitted as soon as possible.

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SOFTWARE ENGINEERS
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Berks/Essex/Surrey

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to £12K
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Sussex

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